


Examining the Role of Goal Setting and Self-Monitoring on Sixth Grade Students' Motivational Beliefs and Performance

by

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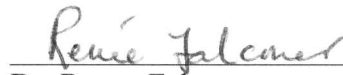
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Dedication

I would like to dedicate this work to my family. Mom, you taught me that I could do anything I put my mind to. Matt, you have always supported me and listened as I rambled on with every problem—you plus Starbucks equals the best therapy on the planet.

To my darling boys—CJ, William & now Noah—you are the future. Find your passion and run with it!

Mike, you are my rock. The one who pulled me through this and stood by me until the bitter end...picking up the pieces and taking care of me all the while...your devotion, your love, and the way you kept the world at bay while I wrote helped make this dream a reality.

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because the kitchen table was too littered with papers and books...and you are, as always,
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Abstract

EXAMINING THE ROLE OF GOAL SETTING AND SELF-MONITORING ON SIXTH GRADE STUDENTS' MOTIVATIONAL BELIEFS AND PERFORMANCE

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George Mason University, 2010

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The purpose of this mixed-method study was to examine the effects of goal setting and self-monitoring on 70 sixth-graders' motivation and performance solving puzzles. Students were randomly assigned to one of four experimental conditions or the control group and completed scales measuring self-efficacy, self-reactions, task interest, attributions, and goal orientation; follow-up interviews explored students' use of self-regulation strategies. It was hypothesized that experimental groups would outperform the control group on all measures. Results showed: significant changes in puzzle performance, self-reactions and self-efficacy due to goal setting; significant increases in task interest for self-monitoring; and a significant interaction between goal setting and self-monitoring for self-reactions. Positive correlations were found between types of attributions made and puzzle performance, self-reactions and self-efficacy. Qualitative

analysis found trends related to the self-regulation process. Educational implications of the findings and avenues for future research are considered.

Chapter 1. Introduction

Learning happens everywhere. Listening beyond the clamor of voices and laughter on a playground, you can hear children learning; “Throw it this way!” or “Pump your legs so you can go higher!” are common utterances. On that playground, students are learning and teaching each other through their actions and their interactions. In the classroom learning continues to happen, through the explicit, formal teaching that occurs during lessons, and in the implicit, informal learning that students absorb from the actions of those around them (Bransford et al., 2006). Studies conducted over the past 20 years show us that these school interactions, part of the heart of the school culture, can be powerful influences on students’ views of themselves as learners (Bandura, 1977, 1997; Zimmerman, 1989a, 1989b, 1994, 2000, 2004).

In addition, once the bright yellow school buses leave the school yard and deliver students to their homeward destinations, learning continues to happen. Families can also be powerful influences on students’ learning; more specifically, students’ perceptions of their home environments also significantly shape their views of themselves as learners (Borman & Overman, 2004; Feldman, Masalha, & Alony, 2006; Felner, Seitsinger, Brand, Burns, & Bolton, 2007; Gallimore & Goldenberg, 2001; McBrien, 2005; Sorrentino, Nezlek, Yasunaga, Kouhara, Otsubo, & Shuper, 2008). How similar or dissimilar these two environments are can determine the ease with which students

navigate their academic journeys (Bronfenbrenner, 1977, 1986). The harmony or disharmony of the school and home cultures can engender struggle or encourage success from the very earliest ages (Fulgini, 1997; Sirin & Stipek, 2003).

When looking at ways to encourage scholastic success, researchers have found that students who engage in the process of self-regulation tend to experience higher levels of achievement and engagement in their academic environments (Schunk & Zimmerman, 1998; Zimmerman, 1989a, 1989b, 1994, 2000, 2004). The research supports the idea that teaching students how to develop self-regulation strategies in school and/or at home could yield positive results that help all students become successful. In order to develop ways to effectively integrate self-regulation in the school curriculum, it is necessary to better understand how this process develops in students and how their individual backgrounds play a part in their acquisition of these skills.

The purpose of this study was to investigate the self-regulation process in selected sixth-grade students. To better understand some of the specific strategies that have been shown to support self-regulation process, this study explored the effect of goal setting and self-monitoring on the sixth-grade students' motivation and performance while completing a challenging puzzle. Other factors, such as the students' self-efficacy, self-reactions, goal orientation, attributions as they engage in the task, and interest in the task, were measured to understand the impact of those strategies on the students' motivation and engagement in the self-regulation process. In addition, the students' perceptions of their home experiences and how that perception influences their self-regulation process

were also examined to get a richer understanding of how the process of self-regulation develops in the students.

Background of the Problem

One of the factors that help determine a students' success in the school environment is their ability to regulate themselves in the academic environment (Schunk & Zimmerman, 1998; Zimmerman, 1989a, 1989b, 1994, 2000, 2004). The skills involved in successful self-regulation help shape a students' motivation and their ability to persist when learning becomes difficult (Pajares, 1996; Pajares & Miller, 1994). From the 1950s, when Bloom began his research looking at the way college students solve problems, researchers have been interested in how students approach difficult tasks, what factors impact a students' motivation when they are faced with something challenging, and what strategies or skills they use to overcome these challenges (Bloom & Broder, 1950). This was only the beginning; current research continues the attempt to untangle the complex web of self-regulation, motivation, self-efficacy, and the influences that impact these factors (Kitsantas & Zimmerman, 2009; Pajares, 1996; Pintrich & De Groot, 1990; Schunk, 1990, 1991, 1994; Schunk & Zimmerman, 1998; Zimmerman, 1989a, 1989b, 1994, 2000, 2004; Zimmerman & Kitsantas, 1997, 1999, 2002, 2005).

Understanding the relationship between self-regulation and motivation is even more critical in the current environment. As schools are under more pressure to increase student achievement, the need for interventions designed to motivate students is higher than ever (Anderman & Wolters, 2006). The existing research examining ways to increase motivation have highlighted several areas that offer exciting possibilities for

interventions; by better understanding the influence of goal orientation, attributions, self-efficacy, and self-regulatory processes on students motivation, it may be possible to develop a comprehensive plan that could be incorporated into schools' existing practices (Bandura, & Schunk, 1981; Kitsantas & Zimmerman, 2009; Pajares, 1996; Schunk & Zimmerman, 1998; Zimmerman & Kitsantas, 1997, 1999, 2005).

For such an intervention to be successful, it must be adaptable to the diverse student population that exists in schools today. For that reason, culture is relevant to the current study because there is support for the idea that culture may impact students' self-efficacy, their use of self-regulatory strategies, their motivation, and the types of goals they set for themselves (Feldman et al., 2006; Greenfield et al., 2006; Juvonen, 2006; Okagaki, 2006; Plaut & Markus, 2005; Sorrentino et al., 2008; Zhang & Mittal, 2007; Zimmerman, 2004).

Culture, as a broad term, has been investigated in many ways. However, until recently, the definition of culture utilized by scholars has merely scratched the surface of its true meaning (Nieto, 2002). In current research, culture has been described as multifaceted construct, one that parallels linguistics, having both deep and more surface characteristics (Nieto, 2002). As Banks noted in his work in multicultural education, culture can be addressed in education in a similar way, ranging from a superficial heroes and holidays approach to a more significant method that addresses similarities and differences and challenges issues of equity in a critical justice paradigm (Banks, 2008). This study seeks to use that more complex idea of culture, that it is a multifaceted concept comprising many things such as a person's ethnicity, gender, and socio-

economic status, and to examine culture's place in education as a lens for understanding the development of self-regulation strategies in students.

To use this broad idea of culture as a lens for understanding self-regulation, it must first be defined. Some studies have looked at culture as a difference in ethnicity, some have used socio-economic background as an indicator, and still others use the term *cultural identity*, referring to characteristics or patterns of behavior that are shared among a group of people (Berry, 2000). While the differences in these choices are interesting and worthy of note, it is also important to note their commonalities. In every case, the academic achievement studies utilizing the various terms for culture are looking at a deviation, or a way in which the learner is unique from his/her peers, the teacher, or the school setting in general. This divergence, indicated by whichever term is being used, is essential to the current discussion because in terms of the social cognitive perspective, learning is a social exercise, and differences between students can make the social interactions necessary for teaching and learning more challenging (Zimmerman, 2004).

In fitting with the social cognitive perspective, culture is defined as a self-perception composed of both a self (in here) concept and group (out there) concept; this perception results from an individual's activity (as a consequent of behavior) or it influences an individual's behavior (as an antecedent; Berry, 2000). Because the context of this study was an academic setting, this study looked at culture through interactions, observations, and interviews with students. For this reason, this study was able to look only at students' perceptions of their home experiences. It was hoped that examining even this narrow slice of students' perceptions of their culture may help us begin to

develop a deeper understanding of the ways their home cultures influence their motivation and the ways they regulate themselves (Li, 2010).

Significance of the Study

This study is significant because it explored the development and influences of self-regulation in selected sixth-grade students by observing them in various experimental conditions that employ the self-regulation strategies of goal setting and self-monitoring. It goes further by following up with a few students from each condition and asking them to explain this process and their experiences of self-regulation in their own words; having students explain their experiences and perceptions may provide some insight into the ways their cultural background has impacted this development.

The study also provides some support for specific strategies that make a difference in the students' performance, motivation, and self-efficacy. We can then move into doing and applying by putting that knowledge to work and incorporating these strategies in the classroom in a variety of contexts. If such strategies are explicitly taught in school, they could provide students with tools they can use when they encounter challenging tasks, potentially increasing their efficacy, motivation, and ultimately their academic achievement.

This study is also unique in its approach because it considers the students' goal orientations and the relationship between their goal orientation and other motivational factors. Grant and Dweck (2003), in a compilation of five studies of achievement goals, found that certain goal orientations could have a positive influence on motivation and performance during challenging tasks. Understanding if and how goal orientation

influences students' motivation as they approach a challenging task could potentially help educators as they plan instruction; helping students develop a goal orientation that positively influences their motivation could help them succeed academically.

Additionally, this study could be significant because it looks at students in an International Baccalaureate (IB) school. The IB organization states that its mission is to develop inquiring lifelong learners (2005). Working in this philosophical framework, the IB organization advocates very student-centered, inquiry-based instructional practices; this approach to instruction may differ from that found in other, non-IB schools. Because of these potential differences, students' experiences in an IB school setting may be an influence on their development of self-regulation skills, and the current study may contribute to an understanding of how an IB school environment affects the development of self-regulation strategies in its students.

Research Questions

This study seeks to better understand the process of self-regulation in selected sixth-grade students by looking at the strategies of goal setting and self-monitoring. The students were taught goal-setting and self-monitoring strategies in order to determine if students use those strategies to help them persevere and be successful when faced with a challenging novel task. To determine the effectiveness of those strategies, the following questions were asked:

- a. Is there a main effect for goal setting on the students' performance, goal orientation, interest in the task, self-efficacy, and self-reactions?

- b. Is there a main effect for self-monitoring on the students' performance, goal orientation, interest in the task, self-efficacy, and self-reactions?
- c. Is there an interaction between goal setting and self-monitoring on the students' performance, goal orientation, interest in the task, self-efficacy, and self-reactions?
- d. Do students' attributions regarding their failure to solve the puzzle differ across the goal-setting and self-monitoring conditions?

This study also strives to cultivate a preliminary understanding of the various influences, such as students' perception of their home and school cultures, on the development of self-regulation and self-efficacy. It explores the students' knowledge base in an attempt to answer the following questions:

- e. In what ways do students approach the puzzle task when given an outcome goal and does that differ from the ways students approach the task when given a process goal?
- f. What characterizes the experiences of students who show high levels of self-efficacy and is there any evidence of cultural influences in these factors?

It was hypothesized that all experimental groups would perform better on the puzzle than the control group, and that there would be a significant main effect for goal setting and self-monitoring on performance and on all measures administered. It is also hypothesized that there will be a significant interaction between goal setting and self-monitoring on students' performance and on all measures administered.

Definitions

For the purposes of this study, the following definitions will be used. These terms were selected to help the reader understand the relevant research from the field of educational psychology, but they are not meant to be an exhaustive list of terms found in the literature:

Self-Regulation: Self-regulation is defined by Zimmerman (1989a) as a process that enables students to take responsibility for their own learning by employing specific strategies to achieve their goals based on self-efficacy perceptions.

Self-Efficacy: Self-efficacy is a context-specific term that refers to a person's insights about their abilities to achieve a task (Bandura, 1977). In this study, the term is referring to students' self-efficacy of their ability to solve a challenging novel task.

Goal Setting: Goal setting is a strategy used in the forethought phase of self-regulation. In this study, students set outcome goals, where they were focused on how many pieces of the puzzle they could solve, or set process goals, where they were focused on the steps of solving the puzzle (Zimmerman, 1989b).

Goal Orientation: Goal orientation is based on the differing beliefs about the stable or contextual nature of the goals being set (Pintrich, 2000). Two major types of orientations emerged from studies of goal orientation: outcome/performance goals and process/ learning goals (Benenson & Dweck, 1986). In this study, goal orientation refers to a focus on the process or outcome when setting the goal.

Self-Monitoring: A strategy used in the performance phase of self-regulation, self-monitoring occurs when a student keeps track of their progress toward a set goal. In this study, students either kept track of how many practice cards they completed, or they kept track of the steps they were following in order to solve the puzzle (Zimmerman, 1989b).

Culture: Culture is a complex construct consisting of a self (in here) concept and group (out there) concept, and it can result from an individual's activity (as a result of behavior) or it can be an influence (or precursor) of behavior (Berry, 2000). Culture also represents a knowledge base that is formed from each person's unique experiences, and these experiences are shaped by a number of influences including a person's ethnicity, socioeconomic status, and gender (Banks, 2008).

Self-Reactions: A part of the self-reflection phase of self-regulation, self-reactions can be understood as a student's satisfaction or dissatisfaction with his/her performance or as conclusions about ways a student needs to change their approach to a task (Zimmerman & Kitsantas, 2005). In this study, self-reactions were measured as the students' satisfaction with their puzzle performance.

Attributions: Attributions are a means of inferring the cause of an event. Licht and Dweck (1984) explained that attributions are ways students respond to academic challenges. Students' attributions can lead to increased or decreased motivation, based on the students' perceptions about the reason for success or failure (Licht & Dweck, 1984).

Task Interest: Task interest occurs when students value a task for the task itself rather than the outcomes they might gain if they achieve the task (Zimmerman, 2008).

The following chapter explores these terms as they appear in the current body of literature. It will also provide a more thorough explanation of the ways these terms are connected in the process of self-regulation as they are interpreted in the current study.

Chapter 2. Literature Review

In this chapter, the literature relevant to an examination of students' academic self-regulation, their motivation, and the cultural influences that may have some bearing on these factors will be reviewed. It is divided into five sections: (a) conceptual framework; (b) self-regulation; (c) the processes of self-regulation; (d) motivational beliefs; and (e) culture and self-regulation. When possible, classroom examples are incorporated to provide a sense of how these factors influence students' educational experiences.

Conceptual Framework

This study uses social cognitive theory, developed in the work of Bandura, as the basis of its conceptual framework. At the heart of this theory is human agency; in other words, people actively take part in their own learning and development. Social cognitive theory also explains that people's behavior, personal factors, and their environment are three components that interact and influence the process of their development. This idea of human agency, as it is described in Bandura's social cognitive theory, is essential to the current research because it provides a basis for understanding how people learn and develop through their interactions with others in a variety of contexts (Bandura, 1986; Zimmerman, 1989a, 1989b, 1994, 2000, 2004).

In the academic realm, influences on students' development can include parents, siblings, teachers, peers, and even perceived cultural norms. In another theory guiding this research, Bronfenbrenner's Social Ecology Theory (1977), the influences on development start with the microsystem (the self and immediate interactions) and expand outward to the mesosystem (interrelations between the major systems in a person's life), the exosystem (specific social structures are included in the existing relationships), and ultimately the macrosystem (embracing the overarching institutional patterns and outlying political, economic, and social systems). This relates to the current study because the influences found in the various systems or environments where students live and go to school may help or hinder their ability to self-regulate. Understanding how the students interpret the various influences in these systems may allow us to design interventions that help students learn to self-regulate in their academic environment.

Through the lenses of social cognitive theory and social ecology theory, it is easier to see how a complex construct such as culture may affect students' development of self-regulation skills. The following diagram provides the conceptual framework guiding this study, illustrating the proposed relationship between the factors that influence students' ability to self-regulate. In the next section of this review, self-regulation will be defined, and relevant research about self-regulation in the school setting will be examined.

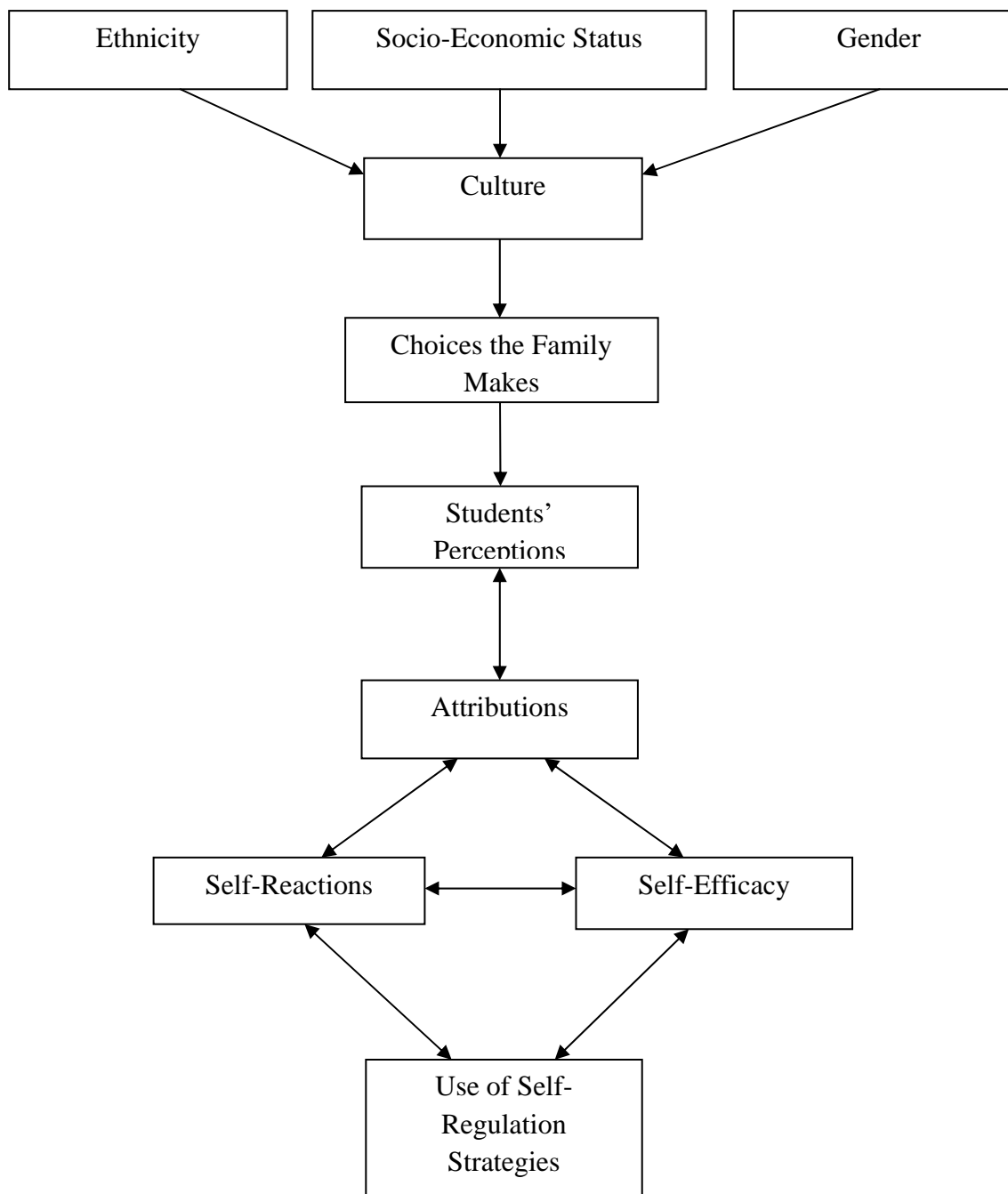


Figure 1. Conceptual framework of the relationship between culture and its potential effects on students' use of self-regulation strategies.

Self-Regulation

Social Cognitive Theory describes learning as a relationship between behavioral, environmental, and social factors, and self-regulation is an important construct examined in this theory. Self-regulation, a construct that stems from Bandura's work, is based on the idea that individuals possess certain capabilities that allow them to influence their own development because the processes of self-regulation can help them control their response to external stimuli (1986).

The idea of self-regulation and its related processes is perhaps most clearly defined in Zimmerman's research, which refers to a cycle of self-regulation that contains three phases. This tricyclical model of self-regulation comprises a forethought phase that includes processes such as task analysis and self-motivation beliefs, a performance phase that encompasses self-control and self-observation, and a self-reflection phase that incorporates processes such as self-judgment and self-reaction (Zimmerman, 1989a, 1989b, 1994, 2000, 2004). In the school setting, self-regulation is seen when students are able to set goals, keep track of how they are doing in their classes, reflect on their learning, and adjust their goals accordingly to be successful academically.

Numerous research studies have demonstrated that self-regulation, or more specifically the strategies involved in successfully implementing the cycle of self-regulation, can lead to increased motivation and academic success (Kitsantas, Zimmerman, & Cleary, 2000; Pajares & Miller, 1994; Pintrich & DeGroot, 1990; Schunk, 1990, 1991, 1994; Schunk & Zimmerman, 1998; Zimmerman, 1989b; Zimmerman & Kitsantas, 1999). Because of the considerable potential for increased

academic success when students self-regulate, the next section of this review will examine the relationship between motivation and self-regulation.

Processes of Self-Regulated Learning

When considering the cycle of self-regulation in an academic setting, a number of processes influence this cycle and a number of strategies enable successful academic self-regulation. Zimmerman (1989a) used the triadic nature of the social cognitive theory proposed by Bandura (1977, 1986) to classify influences to the self-regulation process as belonging to one of three reciprocal categories: personal, environmental, or behavioral. An example of a personal influence might be a student's self-efficacy beliefs about his/her reading ability, environmental influences might include teacher feedback or peer interactions, and behavioral influences could include a student's use of a learned strategy to monitor their progress toward a set academic goal (Zimmerman, 1989a).

In addition to these influences on the self-regulation process, strategies associated with every part of the phase of the self-regulation process can help students improve their ability to self-regulate. In the forethought phase, strategies that could improve self-regulation include task analysis and goal setting. In the performance phase, such strategies as self-observation and self-monitoring can increase students' self-regulation and persistence when faced with a challenging task (Zimmerman, 1989a). Finally, in the reflection phase of the self-regulation process, students reflect on what they have learned, evaluate their progress toward their goal, and revise that goal, if necessary. This study seeks to understand the process of self-regulation as it develops in students and to identify strategies that will help students develop academic self-regulation; it also seeks

to find strategies that can be easily integrated into the existing academic curriculum. For that reason, this study will focus on goal setting and self-monitoring processes that have been used together successfully in previous research and can easily be incorporated into lessons that teachers may already be teaching (Cleary & Zimmerman, 2004; Kitsantas & Zimmerman, 2009; Moore, Prebble, Robertson, Waetford, & Anderson, 2001; Zimmerman & Kitsantas, 1999).

Goal Setting

Goal setting is a process that can play an integral part of the self-regulatory process; a component of the forethought phase of self-regulation, students' ability to set goals for themselves is the first step in the cycle of self-regulation (Zimmerman, 1989a, 1989b, 1994, 2000). Also studied as a component of self-efficacy, the types of goals students set for themselves can function as an indicator of their expectancy outcomes. In turn, students' expectancy outcomes serve as a measure of their self-efficacy. This occurs because students engage in tasks in which they feel competent and confident and avoid those in which they do not (Pajares, 1996). In a similar fashion, the goals students set reflect their perceived competence, and their goals then establish the standard for their beliefs about their self-efficacy (Pajares, 1996). The research on goal setting looks at how different goal-setting conditions influence various outcomes of self-regulated learning and motivation (Kitsantas, Reiser & Doster, 2004; Schunk & Zimmerman, 1998; Zimmerman & Kitsantas, 1997, 1999). To better understand the influence of goal setting on students' self-regulation and motivation, it is necessary to understand the different types of the goals they could set.

Several parameters of goal setting can influence the effect of goals on students' motivation and self-regulation; these variations include goal proximity, goal difficulty, and goal specificity (Schunk, 1996). The existing research has examined these factors and suggests that students who set proximal goals that are moderately challenging and specific to the task show higher levels of achievement than students who set distant goals that are too easy or too difficult and vague in their intent (Bandura, 1988, 1997; Matthews, Zeidner, & Roberts, 2006; Schunk, 1996). The literature also suggests that the increase in achievement related to goal setting may be linked to the increase in motivation and self-regulation that occurs when students set specific proximal goals of a challenging nature; these types of goals increase motivation and self-regulation because they guide the students' efforts as they engage in a task by providing information that shapes their beliefs about their progress (Bandura, 1997; McClelland, 1987; Schunk, 1996).

In addition, many of the studies examining goal setting have looked at goal focus, or what happens when students set either a process goal or an outcome goal (Schunk & Zimmerman, 1998; Kitsantas, Reiser, & Doster, 2004; Zimmerman & Kitsantas, 1999). Students in process goal groups are encouraged to focus on methods that can help them master a skill, while students in the outcome goal groups are encouraged to concentrate on achieving the desired outcome. For example, Zimmerman and Kitsantas (1999) examined high school students' acquisition of writing revision skills. In that study, students in each experimental group were taught a strategy for combining a number of short, basic sentences into one more complex sentence. During the practice session,

students in the process goal group were asked to concentrate on using the revision process they were taught, and students in the outcome goal group were told to focus on the desired outcome—to try to combine the sentences into one complete sentence using the fewest possible words. The authors found that participants in the process goal group outperformed participants in the outcome goal group. This is similar to findings in other studies investigating process goals and outcome goals; most have suggested that students who are given a process goal outperform students who are given an outcome goal (Schunk & Zimmerman, 1998; Kitsantas, Reiser, & Doster, 2004; Zimmerman & Kitsantas, 1999).

In addition to improving students' performance, several studies have shown that encouraging them to focus on process goals instead of outcome goals may also have a positive effect on their self-efficacy beliefs, satisfaction with their performance, and task interest (Kitsantas, 2002; Schunk, 1989; Zimmerman & Kitsantas, 1997, 1999). For example, in a study examining the development of motor skills, Zimmerman and Kitsantas found that students who implemented process goals reported higher self-efficacy, greater satisfaction with their performance, and greater task interest than students who focused on outcome goals (1997).

The Zimmerman and Kitsantas study examined goal setting by collecting data on ninety high school girls as they learned to play darts during their physical education classes (1997). The conditions in the study were (a) a practice only control group, (b) a process goal group, (c) a process goal group that self-monitored, (d) an outcome goal group, (e) an outcome goal group that self-monitored, (f) a shifting goal groups, (g) a

shifting goal group that self-monitored, (h) a transforming goal group, and (i) a transforming goal group that also self-monitored. All participants were taught to play darts using a specific sequence of steps; after the initial instruction period, the students then practiced in one of the previously mentioned goals setting conditions for 20 minutes. At the end of the practice period, each participant completed a post-test for dart throwing, and scales for self-efficacy, self-reactions, intrinsic interest and attributions. The data the researchers gathered showed that students who were in the process goal groups displayed higher dart skill, higher self-efficacy, higher self-reactions, and more interest in the task than students in the outcome goal groups.

In a similar study, the same researchers examined the effect of setting process or outcome goals as high schools students engaged in a series of lessons instructing them in the process of animating slides. A total of 96 students in ninth and tenth grade were placed into experimental groups that addressed the variables of goal setting, self-evaluation and organizational signals as the students learned the process of animating slides. The students in the process goal groups were instructed to focus on properly performing the steps presented in the lesson during the class period, while the students in the outcome goal groups were told to focus on just completing the lesson during the class period. In addition, some groups evaluated their progress towards mastery of the skill and some groups received organizational cues to help them focus.

Results indicated that students in the process goal groups reported higher self-efficacy, more satisfaction with their performance, and made more strategic attributions than students in the outcome goal groups. Furthermore, students who were in the process

goal groups that were not directed to self-evaluate their own work demonstrated a higher level of animation skill, higher self-efficacy, more satisfaction, and rated the instruction more positively than students in the outcome goal group. The current research builds on this and the previously mentioned studies by examining how the process or outcome goal setting condition will affect students as they engage in a challenging puzzle.

Goal setting is an important factor to consider in educational research because there are times when students must engage in tasks that are not of their choosing. For example, courses students take are sometimes set by the school or their parents. In light of cases such as this, it is even more imperative that students learn to set appropriate goals for themselves and their learning so they are able to persevere and regulate their behaviors when they do not have a high level of self-efficacy or task interest. In addition to goal setting, research in this area has provided support for the idea that self-monitoring of progress toward the goals that have been set can increase motivation and persistence in a task (Zimmerman & Kitsantas, 1997, 1999).

Self-Monitoring

Self-monitoring, another strategy involved in self-regulation, occurs in the performance phase of the self-regulation cycle as individuals keep track of how they are doing in accomplishing the goal set in the planning phase of the cycle. Self-monitoring prompts regulation of cognition and learning (Zimmerman, 1989a). For example, during this phase of the self-regulation cycle, metacognition occurs when a student looks back at an event and evaluates his progress, determining if a change in direction is necessary during the next cycle of self-regulation (Zimmerman, 1989a).

Many of the studies conducted on the strategy of self-monitoring reported that it was successful in helping students stay engaged in a task and it increased chances for success with the task (Cleary & Zimmerman, 2004; Obach, 2003; Rock, 2005). While it is most often seen in the literature as a way to monitor behaviors such as attention or self-control, there are cognitive applications for this strategy, and there is empirical support linking self-monitoring to goal setting in ways that encourage academic success at all grade levels (Cleary & Zimmerman, 2004; Moore, Prebble, Robertson, Waetford, & Anderson, 2001; Zimmerman & Kitsantas, 1999). Some examples of studies that examine the combination of goal setting and self-monitoring are reviewed in the following section.

In the previously mentioned study conducted with high school girls throwing darts (n=90), Zimmerman and Kitsantas (1997) also examined the influence of self-monitoring on the girls' attainment of the skill. As noted in the earlier description, the girls were placed into eight experimental conditions that included four types of goal setting and two levels of self-recording. After a few minutes of practicing throwing darts, the girls were given a post-test on dart skill and completed measures for self-efficacy, self-reactions, task interest, and attributions.

The researchers found that self-monitoring had a positive impact on the girls' dart throwing, skill acquisition, their self-efficacy beliefs, and their self-reactions (Zimmerman & Kitsantas, 1997). These increases in skill, self-efficacy, and self-reactions show that self-recording enhanced the students' self-regulatory cycle; further discussion in this study explained that the evidence of change in the girls' self-reactions and self-efficacy showed an increase in their metacognitive ability as well.

Self-monitoring and goal setting were also researched in a longitudinal study that examined academic competence and motivational beliefs of middle school students that were demographically similar to the population of students used in the current research (Obach, 2003). A total of 142 students attending an urban school were tested in fifth, sixth, and seventh grades across three consecutive years. More than half of the students in the study came from a minority group, and 55% of the group was female. The study utilized self-perceived competence scales, attribution scales, and self-reports of study strategies that included rote strategies, cognitive strategies, self-monitoring strategies, and persistence.

The results of this study provided evidence that despite shifting roles of attribution beliefs, self-monitoring strategy use was one factor that predicted perceptions of academic competence for students in all grade levels (Obach, 2003). The other contributing factors cited by researchers were the adoption of mastery/learning goals and persistence in their work (Obach, 2003). This more in-depth look at the development of a self-monitoring strategy with goal setting and the success when they are incorporated with other strategies of self-regulation lends support for the current research and the use of a combination of self-monitoring with goal setting. The combined use of these two processes has also been researched with students from a wide variety of ability levels, as shown in the following study by Rock (2005).

In the study, conducted with students between the ages of seven and 13, researchers found that a strategic intervention including goal setting and self-monitoring of both attention and performance was successful in enhancing academic performance for

the participating students (Rock, 2005). This multiple-baseline-across-subjects study had nine subjects from a wide variety of academic levels in inclusive, multi-age classrooms. Researchers taught student participants a mnemonic self-monitoring strategy that included the following steps: articulate your goals; create a work plan; take pictures; reflect using self-talk; evaluate yourself; and act again (ACT-REACT). After this lesson, students' engagement and productivity were measured during both intervention phases and both baseline phases of the experiment. The researchers found that engagement and productivity improved when students used the self-monitoring strategy. While the study was limited in the number of subjects it studied, the depth of information for each student provides a snapshot of the ways self-regulation develops in a wide variety of students. It also provides support for the idea that goal-setting and self-monitoring strategies can be effective for students with a wide variety of ability levels (Rock, 2005), a factor that will be investigated in the current research.

The previous studies illustrate that self-regulatory processes such as goal-setting and self-monitoring can impact students' performance and that academic environments can increase the use of such strategies. However, students' level of self-regulatory strategy use can also come from students' natural tendencies and backgrounds. To better understand these potential influences at work in students' lives and the role these influences may play in the current research, the next section of this review examines how a student's culture may relate to the various facets of self-regulation.

Motivational Beliefs

Motivation is a well-researched construct in the field of educational psychology, and there are multiple social cognitive conceptualizations of motivation. These interpretations include a variety of constructs and theories that can influence motivation including goal orientation, self-reactions, self-efficacy, task interest, and attributions (Dweck & Leggett, 1988; Elliot & Dweck, 2005; Pintrich & De Groot, 1990; Weiner, 2010; Wolters, Yu, & Pintrich, 1996). This section will address each of these factors, reviewing studies that provide support for the classroom application of these ideas.

Goal Orientation

Goal orientation researchers look at the different purposes people have for choosing to engage in a task. These purposes, or goals, are a foundational piece for understanding their motivation; goal orientation theorists take it a step further. Research relating to this theory of motivation look for an integrated and organized pattern of beliefs about the purposes or reasons for achievement, and the standards or criteria that will be used to judge successful performance (Benenson & Dweck, 1986; Dweck, 2002; Dweck & Leggett, 1988; Pintrich, 2000; Urdan, 1997). Two major types of goal orientations emerged from these studies: a performance goal orientation and mastery goal orientation (Benenson & Dweck, 1986; Dweck & Leggett, 1988; Elliot & Dweck, 2005).

A performance goal orientation, characterized by the setting of outcome goals, is a way of thinking that focuses on the end result. The objective of outcome goals is to show competence or to avoid showing incompetence (Elliot & Dweck, 2005). In contrast, a mastery goal orientation is characterized by the setting of process goals, and this way of

thinking focuses on the course of action, or the steps you take to reach the goal. The objective of process goals is to develop capability and master the task (Elliot & Dweck, 2005). These two types of goal orientations are marked by differences in behaviors and motivational factors (Elliot & Dweck, 2005); and for students, the different types of goals they could set is an important factor to consider both for them and for researchers studying goal setting in an educational context.

A number of studies have highlighted the role goal orientation plays on academic achievement at various grade levels from elementary school through high school. A sampling of these studies will be reviewed in order to provide an overall picture of the implications of goal orientation in various academic contexts as it relates to the study conducted in this dissertation.

Wolters, Yu, and Pintrich (1996) conducted a study with 434 seventh, eighth, and ninth graders who are similar in age and demographic distribution to the sample in the current study. The Wolters et al. study examined the effect of goal orientation, motivational beliefs, and self-regulatory strategy use on the students' academic performance in mathematics, English, and social studies. By administering surveys at the beginning and end of the school year, the researchers were able to establish that mastery goal orientations were positively correlated with adaptive motivational beliefs and self-regulated learning and that performance goal orientations were negatively correlated with self-efficacy, self-regulated learning, and performance across all of the academic areas.

In addition, the results of this study led researchers to conclude that performance goal orientations were positively correlated with test anxiety, as students who were

focused on the outcome goal of getting high grades experienced a fear of failure during test-taking situations. These results highlight the fact that students' goal orientations can be extremely important to consider in the classroom environment as they can effect students' self-regulation, motivation, and class performance.

In a British study with a similar task to this dissertation research, Hole and Crozier (2007) investigated the effect of learning (mastery) goal orientations and performance goal orientations on students' engagement, self-efficacy, and persistence as they solved two Tangram puzzles. After administering the Patterns for Adaptive Learning Scales (PALS; Midgley et al., 1997) to 110 students between the ages of nine and 11, the researchers placed 53 students who scored high or low on the survey in either the mastery/learning goal or performance goal experimental conditions. Students in every experimental condition worked to solve two puzzles.

In the initial puzzle-solving experience, students were given an impossible puzzle to solve. As students worked to solve this puzzle, researchers observed students' time on task behavior to measure their persistence; they also administered a 5-point Likert scale to each student after the impossible puzzle task to measure their self-efficacy in terms of their ability to solve the puzzle. In the second puzzle-solving experience, researchers asked the students to choose the difficulty level of the puzzle they would like to try. During the course of this second puzzle-solving experience, students were asked if they would like a clue to help them solve it. The difficulty level of students' final task choice measured the students' interest in the puzzle, and the students' choice of clues (big or

small) measured their help-seeking behavior; another, identical, 5-point Likert scale was administered at the end of the second puzzle task to measure students' self-efficacy.

As they hypothesized, researchers found that students in the learning/mastery goal orientation groups showed more persistence and engagement in both puzzles and more adaptive patterns of self-regulatory strategy use than the students in the performance goal orientation group. They also found that the experience of failure on the first task impacted students' self-efficacy scores and their approach to the second puzzle; students in the performance condition stopped earlier on the second puzzle, even if they had worked for the entire time period allotted for the first puzzle. Researchers suggested that the fear of a repeated failure with the second puzzle had a greater influence on students in the performance goal orientation, causing them to withdraw from the puzzle (Hole & Crozier, 2007).

The research conducted during this study is very similar to the Hole and Crozier (2007) study in that it measures students' self-efficacy and task interest as they work on a challenging puzzle. This study also observes students as they are struggling with the puzzle and seeks to learn more about that struggle and how goal orientation might influence the students as they engage in a challenging task. This dissertation research differs, however, because it takes the Hole and Crozier (2007) study a step further by asking about students' attributions when they fail and by interviewing students after the puzzle task in order to learn if goal orientation has any influence on students' self-regulatory strategy use or their motivation to engage in the puzzle task. The research in this dissertation also differs because it focuses on students' self-efficacy more

intentionally, measuring it more frequently and exploring commonalities among students reporting higher levels of efficacy. Finally, the current study also looks at students' self-reactions, another facet in the relationship between self-regulation and motivation.

Self-Reactions

Occurring in the self-reflection phase of self-regulated learning, self-reactions are a direct result of the way students internalize a learning experience and can have an immediate influence on their affective states (Bandura, 1991). This is noteworthy in terms of motivation because it can also have an influence on students' choices about future learning. For example, after a mathematics quiz, a student who does not do well may have a reaction to that experience that leads him/her to decide they do not like mathematics, they are not good at mathematics, or they may develop a sense of helplessness when it comes to the subject (Zimmerman & Kitsantas, 2005).

Self-reactions are also considered a link between motivation and self-regulation because they can occur as perceptions of self-satisfaction or as adaptive inferences, and these perceptions can vary based on how regulated a student is (Zimmerman & Kitsantas, 2005). In the form of perceptions of self-satisfaction, self-reactions relate to motivation because the positive perceptions lead to increased motivation, and negative perceptions can have the opposite effect (Bandura, 1991). Self-regulation plays a part in this reaction because more highly regulated students link their self-reactions to their learning goals and research has shown that, in those instances, they will show persistence even in light of setbacks (Schunk, 1994).

The adaptive or defense inferences form of self-reactions moves beyond the initial affective state of self-reaction to helping students make choices about their future learning efforts (Zimmerman & Kitsantas, 2005). Self-regulation plays a role in this aspect of self-reactions as well because more regulated students will adopt adaptive inferences designed to change an approach to learning based on a negative outcome, while less regulated students may adopt a more defensive stance that serves to protect them from more negative reactions instead of helping them formulate more effective courses of action for future learning experiences (Zimmerman & Kitsantas, 1997). This aspect of self-reactions is also closely linked to the students' self-efficacy, a topic discussed in greater detail in the following section.

Self-Efficacy

When considering the relationship between self-regulation and motivation in the social cognitive context, one essential personal factor that contributes to achievement outcomes is self-efficacy. As defined by Bandura (1977), this factor ties motivation and self-regulation together by influencing a person's thought patterns and his/her emotional responses, providing the spark that can lead to the use of self-regulation strategies in order to attain a desired outcome. Bandura first initiated the concept of self-efficacy to explain how personal motivation and expectations can affect outcomes, such as persistence and effort (1977), and later Pajares elaborated on this with his own research, which showed that people with a greater sense of self-efficacy will try harder and persevere longer when confronted with challenges than a person with a lower sense of self-efficacy (Pajares, 1996; Pajares & Kranzler, 1995; Pajares & Miller, 1994). Self-

efficacy is examined here because it may influence motivation in the classroom environment by influencing how students' respond to challenging content.

To understand the potential motivational influence of self-efficacy, it is important to understand that Bandura's model of self-efficacy involved two concepts: efficacy expectations and outcome expectations (1977). He defined efficacy expectations as a person's belief that they can implement the specific behavior required to achieve the desired outcomes, and he defined outcome expectations as a person's determination that a specific behavior will produce the desired results (Bandura, 1977). According to this theory, people have control over their own behavior and their beliefs concerning their ability to successfully perform that behavior. However, this is context specific. A person can only estimate the outcomes that will be produced by a behavior given a specific task, and a person's efficacy expectation is most accurate when the person is also familiar with the domain of functioning within which the task is completed (Pajares, 1996). For example, a student will not be successful predicting his/her ability to complete a calculus problem if s/he has never been exposed to calculus; s/he will, however, have some sense of efficacy at solving problems within the domain of mathematics.

The concept of outcome expectations is the other piece in the model of self-efficacy. Bandura's explanation of human agency states that outcome expectations shape behavior and motivation because people generally approach tasks with the end in mind; they hope to achieve positive outcomes and avoid negative ones (Bandura, 1977, 1989). However, this determination of outcomes is not solely based on the value a person places on the outcome. Outcome expectations are closely tied to a person's efficacy

expectations, particularly in tasks where the level of competence has a bearing on the outcome. People will often not attempt a task if they doubt can do what it takes to succeed, no matter how great an outcome may seem (Bandura, 1989).

For teachers, this is valuable information. Self-perceived inefficacy can reduce the promise of motivating outcomes, so understanding students' perceptions about their self-efficacy can help teachers as they try to motivate students in their classrooms. Another aspect of outcome expectations that can help teachers as they work to motivate students is the concept of task interest.

Task Interest

Task interest is an integral part of the relationship between self-regulation and motivation, and the connection between these concepts has two noteworthy aspects. A part of the forethought phase of self-regulation, task interest is related to motivation because students are more likely to self-regulate and persist when there are higher levels of task interest (Deci, 1975). In addition, highly regulated students have been shown to display higher levels of self-efficacy, and that can lead to higher levels of interest in a task (Zimmerman & Kitsantas, 1999, 2005). Related to the concept of valuing a task, task interest refers to a person's enjoyment or satisfaction in the immediate context of a task that is independent of the usefulness of the task (Deci, 1975). For example, a student may persist in a challenging mathematics problem if they have a high level of interest in the task because they enjoy it, while the same student may not show the same persistence when it comes to completing a writing assignment that they do not enjoy (Deci, 1975).

As the example above shows, the concept of task interest is important to the study of motivation in the academic setting because task interest can provide motivation for students in challenging situations (Deci, 1975; Deci & Ryan, 1985). Like self-efficacy and self-reactions, task interest is a context specific; unlike the aforementioned concepts, it can change quickly (Anderman & Wolters, 2006). This means that the classroom environment can be structured to elicit task interest and provide a boost in motivation when students are struggling. Another key to motivating struggling students is to understand the attributions they make when they are not successful.

Attributions

According to Weiner (1972), attributions are “perceptions of causality” (p. 203) and lead people to make a judgment about why certain things occur. This judgment can then influence the person’s course of action, and there is a strong body of research that supports the idea that some attributions lead to more successful outcomes than others (Weiner, 1972, 2010; Wagner, Powers & Irwin, 2001).

The work in attribution theory that relates to the classroom considers the potential attributions students make in light of their success or failure at a task. Attributions can be categorized in terms of internal/external factors, controllable/uncontrollable factors, and stable/unstable factors, and there are a number of attributions along those dimensions that students can choose to explain their performance. In terms of motivation and achievement, there is research to support the idea that attributions are important factors in determining students’ success because students’ choice of attributions can make a difference in their choice to persist in challenging situations or their expectancy of

success (Pintrich & De Groot, 1990; Schunk & Zimmerman, 2006; Weiner, 1972, 2010). For example, if a student fails a test in a challenging course and attributes that failure to effort, a controllable factor, he or she should experience increased motivation because future success resides within the control of the student; he/she simply needs to put forth more effort to be successful. Conversely, if the student attributes the failure to an uncontrollable factor such as task difficulty or luck, he/she may or may not feel motivated to try harder on the next test because they do not have control of those factors and his/her efforts may or may not be successful (Schunk & Zimmerman, 2006; Weiner, 1972, 2010; Zimmerman & Kitsantas, 2002).

Attributions are crucial factors to be considered in this research on motivation and self-regulation in the academic setting because students' perceptions of competence are just as influential as their actual academic competence. The self-efficacy beliefs, self-reactions, and subsequent attributions that shape the students' perceptions of competence are powerful predictors of motivation and the choice to employ self-regulation strategies that can help support success (Wagner et al., 2001; Pajares, 1996).

In addition, the school environment plays a noteworthy role in cultivating the students' self-efficacy beliefs, self-reactions, and attributions by providing opportunities for students to achieve mastery experiences, models the students can observe to judge performance, praise regarding students' abilities and efforts toward achieving academic tasks, and a climate that produces either positive or negative affective states that help determine whether or not students are motivated and use the self-regulation strategies that help support their success (Zimmerman, 1989a; Pajares, 1996; Bandura, 1997).

Within the framework of the social cognitive theory, the concepts of self-efficacy, self-reactions, task-interest, and attributions help explain the connection between motivation and self-regulation (Bandura, 1991, 1986, 1997; Bandura & Schunk, 1981; Kitsantas & Zimmerman, 2009; Schunk, 1996; Zimmerman 1989a, 1989b, 1994, 2008; Zimmerman & Kitsantas, 1997, 1999, 2002, 2005). Research studies examining these factors are plentiful. The following examples focus on the influence of these factors in academic settings and provide support for the current research.

The first study reviewed in this section is a study that investigates goal orientation and attributions. In a series of six experiments conducted by Mueller and Dweck (1998) with fifth-grade students, researchers found a relationship between students' attributions, goals, and the praise they receive. Though each experiment conducted contained slight variations aimed at ruling out alternative explanations for the previous study's findings, all of the experiments included students working on problems with varying degrees of difficulty.

Students in the Mueller and Dweck (1998) study were put into groups and worked on solving problems. During the problem-solving process, some of the students received praise based on their intelligence, some of the students received praise for their efforts, and others received neutral praise. A consistent finding across all of the studies indicated that students praised for intelligence tended to favor a performance goal orientation and choose future opportunities to continue to show a good performance. Students praised for effort more often adopted a mastery goal orientation and took chances that provided them with more learning experiences.

A notable result of this study emerged in the differences between the attributions made by the students in each of the groups: students praised for intelligence attributed their failure to a lack of ability, while students praised for hard work cited lack of effort as the reason for their failure. This divergence in attributions made a significant difference in the students' motivation; their enjoyment, persistence, and ultimately their performance on the task was affected. Researchers also found that the attributions students made influenced the future goals the students tended to choose.

Another set of studies that researched students' goals and the influence on their motivation was conducted by Schunk (1996). In two studies that investigated motivation, achievement, and cognitive skill development, Schunk (1996) researched the effect of students' goal orientation, self-efficacy, and self-reactions as they engaged in a mathematics lesson about fractions. For the first study, 44 fourth-grade students in general education classes were placed in experimental groups that differed in terms of goal orientation and the number of times students measured their reaction or evaluation of their learning. The second study was quite similar; it was conducted with 40 fourth graders as they engaged in the same mathematics lesson about fractions. Both studies measured students' goal orientation, self-efficacy for solving the types of fraction problems found in the lesson, their self-reaction to their progress, and their success with the task as measured by a posttest. The second study differed because it also added a self-satisfaction scale, a goal perception measure, and a more general self-efficacy for learning scale that was administered before the mathematics lesson was taught.

In these studies, positive correlations were found between self-efficacy for learning, self-reactions, and number of mathematics problems completed. Self-reactions also positively correlated to students' posttest self-efficacy, skill, and task interest. The results of these studies led researchers to conclude that a learning goal orientation enhanced the students' self-efficacy, skill, motivation, and task interest. Researchers also concluded that having the students evaluate their performance increased their achievement outcomes because engaging in a self-assessment of their capabilities strengthened their self-efficacy and kept them engaged in the task (Schunk, 1996). This dissertation builds on these results by measuring goal orientation, self-reactions, and self-efficacy as students learn a new skill. It also looks at students' attributions as they struggle, as Zimmerman and Kitsantas (1999) did in the following study.

In an experimental study conducted by Zimmerman and Kitsantas (1999), 84 high school girls learned a new writing strategy while assigned to one of the following groups: a) outcome goal but no self-recording, (b) outcome goal with self-recording, (c) process goal but no self-recording, (d) process goal with self-recording, (e) shifting goal but no self-recording, (f) shifting goal with self-recording, or (g) practice only control group. The researchers taught each group a strategy for combining sentences and provided time to practice the new skill. After the practice session, each group completed a number of scales that measured the students' writing skill, self-efficacy, self-reactions, interest and attributions.

The researchers found significant positive correlations between attributions of writing deficiency to a lack of strategy. They also found high scores on the self-efficacy

scale, high scores on the self-reactions scale, and high interest in the task positively correlated with higher writing skill. Conversely, attributions to a lack of ability were significantly correlated to lower scores in self-efficacy, lower self-reaction scores, and lower scores for writing skill. Attributions made to a lack of effort were significantly correlated to lower interest and lower writing skill. Attributions concerning the difficulty of the task showed a significant correlation to high self-reactions.

In addition to the results surrounding students' attributions, researchers concluded that self-recording improved the effects of goal setting in terms of increasing students' writing skill and motivation. They also concluded that students in the self-recording conditions displayed higher self-efficacy, self-reactions, and interest in the task. This study is a foundation for the current research, which looks to replicate the study's findings with middle school students working on a challenging puzzle task.

The previous section highlighted the relationship between self-regulation and motivation. It also examined a number of studies that provided empirical support for the idea that self-regulation influences students' motivation in a number of ways, including through the influence of students' self-efficacy, self-reactions, attributions, and task interest. For that reason, understanding how the development of self-regulation takes place for students is also important. In order to understand self-regulation more clearly and ultimately create school-based interventions that reach the most students possible, it is necessary to delve into some of the different processes involved in self-regulated learning.

Culture and Self-Regulation

Culture, each person's individual set of experiences and perceptions, is an area that has received little attention in the study of self-regulation to date. A few studies will be noted in this chapter, but the potential impact of culture on the development of self-regulation is worthy of more study. As observation and modeling are the basis for the Social Cognitive Theory, this theory is at the heart of our understanding of self-regulatory development (Bandura, 1977, 1989). With that in mind, implications of culture's impact are extensive. Culture is present from the day we are born and leaves its indelible mark as learning begins in the home environment from the very earliest ages (Bandura 1989; Zimmerman, 1989a, 1989b). Furthermore, research shows that family interactions are influential to children's early development of self-regulatory behaviors, and these family interactions reflect cultural values (Feldman et al., 2006; LeVine, 2002). According to Feldman et al., this interaction has a profound impact on infants because factors, such as offering more or less soothing contact, social gaze, active touch, or high arousal, are patterns that exist in various cultures or societies, and these factors shape the infants' environment-dependent brain mechanisms for affect regulation (2006).

These markers of early family interaction are setting the stage for the later development of students' self-regulation. In fact, studies that have been done with toddlers show that children's capacity for self-regulation is dependent on their early, culture-specific experiences (LeVine, 2002) and that there are culture-specific patterns to the development of self-regulation strategies (Feldman et al., 2006). The development of self-regulation strategies is important to consider in the field of education because

numerous studies have linked self-regulation and academic success (Schunk, 1990, 1991, 1994; Schunk & Zimmerman, 1998).

When it comes to the process of self-regulation, development is most effectively facilitated by a model that the student can closely identify with; students' access or lack of access to appropriate self-regulatory models may inhibit their ability to move through the phases of self-regulation (Zimmerman, 1994, 2000, 2004). If students do not have a model they can identify with for the expected strategies and must try to skip to the self-control phase of the model, they will have a much more difficult time acquiring the strategy, and their motivation may be negatively impacted because of lowered efficacy expectations (Zimmerman, 2004).

Culture can also be seen as an influence in the aspect of achievement motivation. Because explicit motives align with a group's expectations or standards (Schultheiss & Brunstein, 2005), the level of compatibility between the home culture's perceptions of academic achievement and the school culture's expectations of academic achievement may be an indicator of students' levels of motivation (Fuligni, 1997; Kenny, Gualdron, Scanlon, Sparks, Blustein, & Jernigan, 2007; Pomerantz et al., 2005). Fuligni (1997), in his research of students from immigrant families, found a significant correlation between a family's strong emphasis on education and the students' motivation and academic achievement. He noted that, behind the students' motivation, there "appears to be a constellation of values and attitudes that places great importance on the role of education" (Fuligni, 1997, p. 352). This motivation to achieve academic success can lead to more self-regulated learners, and that connection is worthy of investigation.

On the negative end of the spectrum, such cultural challenges as prejudice and stereotypes pose a possible obstacle to students' motivation (Borman & Overman, 2004; Kenny et al., 2007; Ryan & Ryan, 2005). Students interviewed in a qualitative study done by Kenny et al. noted racial and ethnic discrimination as a barrier to their achievement that impacted their motivation; this perceived barrier to achievement kept them from trying to achieve academically at times (2007). This is not a surprise given that motivation, from a self-efficacy standpoint, is tied to outcome expectations (Bandura, 1977, 1997). The stereotype threat becomes an issue for motivation when students in different cultural groups are aware of the negative stereotypes that exist about them (Ryan & Ryan, 2005). This stereotyping imparts an additional pressure and focus on performance that has been shown to moderate motivation (Ryan & Ryan, 2005).

Culture is also a variable that needs to be considered when discussing self-efficacy. As stated previously in the section on self-efficacy, the ability of a student to achieve a sense of academic self-efficacy may be partially determined by the affective state of the school climate or culture (Bandura, 1997; Pajares, 1996; Zimmerman, 1989b). According to the reciprocal nature of human agency set forth in Social Cognitive Theory, this school culture will be perceived and experienced in different ways by different students because the self and the environment are continually interacting and influencing each other (Bandura, 1977, 1997). Each student experiences his or her own home environment, which is shaped by his or her home culture; a critical piece of that culture is the parents' values, perceptions, and beliefs (Borman & Overman, 2004; Feldman et al.; 2006; Felner et al., 2007; Gallimore & Goldenberg, 2001; McBrien, 2005; Sirin & Stipek,

2003; Sorrentino et al., 2008). However, to fully understand this idea, a working definition of what the environment entails is needed.

In terms of the Ecological Systems Theory proposed by Bronfenbrenner (1977), students' environments are an evolving part of their development. The ecology of his theory helps explain how, as children grow, the immediate environments that they inhabit are continually changing. Relationships within and between these immediate settings are affecting both the process of the child's development, as well as the larger formal and informal social contexts in which the settings are embedded (Bronfenbrenner, 1977). Bronfenbrenner's four nested systems illustrate the expanding spheres of influence that learners must interact with as they develop, and he noted that the environment is defined by its objective features and the way one perceives those features (Bronfenbrenner, 1977).

So, allowing for Bronfenbrenner's perspective (1977), the culture's influence on the environment must take into account the students' perceptions. That definition would then also include the students' perceptions of their competence in any given environment or their self-efficacy (Bandura, 1977, 1997). Culture can impact students' self-efficacy by shaping their views of their competence (Bandura, 1977, 1997; Pajares, 1996). While Social Cognitive Theory would consider self-efficacy something that a student has the ability to control through his behaviors and his interaction with the environment, some cultures in East Asian contexts emphasize secondary control, believing that external forces are at work in people's lives exerting an influence that is beyond the person's control (Plaut & Markus, 2005). This difference in perception may manifest itself in a

variety of ways, causing success or failure at a task to evoke a different response in students from differing cultural environments (Greenfield et al., 2006; Plaut & Markus, 2005).

In addition, the interaction between the school and home environments may influence a student's development of self-efficacy. If there is a divergence between the school and home cultures, the student may not achieve the efficacy building mastery experiences due to factors such as lowered teachers' expectations (Borman & Overman, 2004; Felner et al., 2007; Fuligni, 1997; Gallimore & Goldenberg, 2001; Hughes & Kwok, 2007; McBrien, 2005; Ryan & Ryan, 2005; Zimmerman 1994) and/or negative peer interactions (Aronson & Steele, 2005). The outcome expectations held by students may also be influenced by a cultural variance in the value placed on the academic tasks being pursued.

The difference in values that exists between different home cultures may also be explained by the idea of implicit ethnotheories put forth in the ethnographic research of Greenfield et al. (2006). Ethnotheories are an aspect of psychosocial functioning that both reflect and exemplify cultural values. According to Greenfield and his colleagues, ethnotheories comprise an implicit definition of the ideal child and foster beliefs about which practices will best nurture and produce that ideal (2006). These beliefs, held by students' family members, are negotiated between members of communities and passed from generation to generation within the family (Greenfield et al., 2006). How well these family definitions of the ideal child fit with the school's definition of the ideal child may help or hinder a child as he or she progresses through the school system.

Greenfield's research also reveals two core dimensions of thought about child development: independence, often held by Western industrialized cultural communities, and interdependence, often held by non-Western cultural communities (2006). The difference in these two approaches to development shape students' socialization within their family settings and may move them along a distinct pathway of development (Greenfield et al., 2006). These pathways may determine students' ideas about knowledge/intelligence (Dasen, 1984; Piaget, 1963), their concept of creativity (Greenfield et al., 2000), or their preferred mode of communication (Greenfield & Suzuki, 1998). All of these factors could make a difference in students' school experiences by potentially creating conflicts between students' ethnographies and the ethnographic beliefs held by the school culture (Greenfield et al., 2006).

These varying beliefs may also show up in a student's ability to develop self-regulation. A study conducted by Purdie and Hattie (1996) examined similarities and differences among the self-regulation strategies used by Japanese students studying in Japan, Japanese students studying in Australia, and Australian students in their home schools. The participants, almost 500 secondary school students from the above mentioned groups, were given short vignettes of academic situations, asked to read them, and then identify the regulation strategies they would suggest using in those situations. The study found that, even though students used similar strategies, there were culturally based patterns in the ways the students used the self-regulation strategies. An interesting finding: The Japanese students studying in Australia began to adopt some of the patterns

of the Australian students and were in fact more closely matched to those students than the other Japanese students in several categories (Purdie & Hattie, 1996).

Another interesting aspect to the Purdie and Hattie (1996) study is the use of qualitative approaches. Butler (2002) discussed the promise of qualitative approaches in the field of research on self-regulation. These strategies, Butler asserted, will allow researchers to understand the development of self-regulation strategies in context, and will help lead to an understanding of self-regulation that includes a social component, incorporating the students and the interplay that exists between them and others in their environment (Butler, 2002). Zimmerman (2008) made a similar point in his more recent work, citing qualitative research as a promising future prospect in the study of self-regulation.

This existing literature provided support for the mixed method approach chosen for the current research. By adding a qualitative dimension to the study, it was possible to discuss the development of self-regulation with the students and learn what they had to say about it.

Conclusion

The reviewed literature has shown that goal setting and self-monitoring can have an effect on students' academic success and motivation (Bandura & Schunk, 1981; Pajares, 1996; Schunk, 1994; Turner et al., 2002; Zimmerman, 1989b, 2004). Goal setting may influence students' motivation by influencing their self-efficacy, or their beliefs about their abilities and the outcome of their efforts (Bandura, 1989; Pajares, 1996). Students' goals for a particular academic context are influenced by their

expectations of success or failure in that context and research shows that those expectations are shaped by the students' self-efficacy (Bandura, 1989). This combination of goals, expectations, and self-efficacy can be powerful predictors of academic success, but they are contextual and are not easily generalized across contexts (Pajares, 1996).

Despite that limitation, self-efficacy is an important factor for educators to consider because studies have shown that self-efficacy can have as direct an effect on students' performance as ability (Pajares & Kranzler, 1995; Pajares & Miller, 1994), and that finding has meaningful implications for students' motivation. If students' self-efficacy can motivate them to persist and meet challenges, then experience with success can in turn impact their future efficacy expectations. The result may lead to a continuing cycle of success. Hence, according to Bandura's model of Social Cognitive Theory, the importance of the task will increase because people tend to value things they feel capable of accomplishing (1986). In other words, helping students feel successful in academic tasks may ultimately help them find value in those academic tasks.

In terms of Bandura's Social Cognitive Theory, cultural conceptions are important to delineate and understand because one of the core assumptions of the social cognitive view is the triadic reciprocal nature of the self, the environment, and behavior (1986, 1989). Furthermore, new areas of research opened up by qualitative methods offer new ways to research self-regulation in context that takes into account the students' environments and their relationships with the people and elements in those environments (Butler, 2002; Zimmerman, 2008). As the research presented illustrates, students' home cultures can influence their self-efficacy, their implementation of self-efficacy strategies,

their motivation, and their goal orientation. This is important to investigate further because the role that environmental influences play in those contexts can have a profound effect on students' academic achievement.

In that spirit, this study investigated the self-regulation strategies of goal setting and self-monitoring and the potential to help students be more successful with a challenging task so that, if successful, these strategies could be integrated into content curriculum and taught to students as tools to help them experience academic success. To achieve that purpose, the current study examined self-regulation in selected sixth-grade students by replicating previous research using the successful strategies of goal setting and self-monitoring. By building on the existing knowledge base, this study provides more empirical support for the use of goal setting and self-monitoring with middle school students in challenging contexts. With more evidence to support the effectiveness of these strategies, teachers can incorporate goal setting and self-monitoring into classroom use, knowing they are providing students with strategies that support their self-regulatory development.

This study also added to the current understanding of self-regulation through its mixed-method approach that looked more deeply at the ways goal setting and self-monitoring were utilized by the students in working the puzzle and elsewhere in their lives. This snapshot of the students' perceptions of goal setting and self-monitoring and the influences those strategies have on students' ability to self-regulate could provide teachers with ideas for implementation; it could also provide researchers with new

avenues for research as the use of these strategies is refined even further for various context-specific uses.

Finally, by hearing from the students themselves about their experiences and perceptions, this study invited those voices into the conversation about self-regulation. These new voices have perspectives, ideas, and ways of knowing that could bring new opportunities to the attention of educators and could encourage future researchers to explore the potential cultural influences at work in students' attempts to self-regulate.

Chapter 3. Method

This study examined the process of self-regulation in a selected group of sixth-grade students. The experimental, mixed-method design used in the study was crafted to better understand how students approach self-regulation during a challenging task, and to determine if there were any differences in the specified constructs between the groups during the experiment. To provide a clearer picture of this research, this chapter explains the methodology selected to answer the research questions. It describes the design, the participants, the measures, and the procedures for collecting and analyzing the quantitative and qualitative data.

Design

To better understand the process of self-regulation in students, this dissertation used a mixed-method design. An initial section, an experimental design that examined whether goal setting and self-monitoring improved students' self-efficacy and/or performance on a challenging puzzle, was conducted. The experimental conditions were based on two types of goal setting (process goal or outcome goal) and two types of self-recording (present or absent). The conditions were: (a) outcome goal with no self-recording, (b) outcome goal with self-recording, (c) process goal with no self-recording, (d) process goal with self-recording, and (e) control group (no goal setting or self-

recording). Once completed, this quantitative piece of the research serves to provide a foundation of data for the qualitative explorations that will follow.

Following the initial quantitative segment of the research, three students from each of the five groups were randomly selected to participate in follow-up focus group interviews. These interviews provided a more focused, in-depth look at how the process of self-regulation develops in the sixth-grade students from the sample population. Guided by the quantitative results, an interview protocol using a mix of closed and open-ended interview questions was developed. Researcher memos were written throughout the research process to justify any inferences made in the analysis of the qualitative data.

School Setting and Participants

The following section describes the school where the research occurred and gives an overview of the student population. It then goes into greater detail about the students that participated in the research.

Setting

The research took place in a suburban middle school in Northern Virginia that serves 1,097 students in an International Baccalaureate Middle Years Program (IB MYP; International Baccalaureate Organization [IBO], 2005). The school is located in a community comprising numerous ethnicities and linguistic backgrounds, and this diversity is reflected in the students attending the school. The reported ethnicities present in the student population are as follows: 15.86% Asian American, 12.22% African American, 41.57% Hispanic American, 26.34% Caucasian, and 4.01% mixed race. In addition, 57.89% of the students in the school receive free or reduced lunches, and

51.14% of the student population is classified as limited English proficient. The school's academic profile is also diverse; 13.22% of the students are enrolled in the school's Advanced Academic/Gifted and Talented Center classes, 34% participate in school-based Advanced Academic opportunities, and 17.14% receive special education services.

Student Participants

Initially seventy-five students from the school's sixth-grade class participated in this study. Of the group, 49% were male and 51% were female. The participating students were representative of the school's entire student body, including a wide range of academic abilities from the academically advanced, gifted and talented center class to the inclusion classes that are more heterogeneous in nature. The students ranged in age from 11 to 12, and they came from varying ethnic and economic backgrounds, representing the wide range of cultural diversity that exists within the school's student body. In addition, all students participated in classes that were taught using the IB MYP curriculum (IBO, 2005). After the initial goal orientation survey was administered to the seventy-five participants, five of the students were dropped from the study due to absence during later sessions or language barriers that prevented them from fully participating in the rest of the study. The final sample size included 70 students.

Task

Students in all the groups were given an identical task: to solve a puzzle after being taught the specific steps needed to solve the puzzle. The brain teaser puzzle chosen for this experiment is called "Serpentiles" (ThinkFun, Inc.). A photo of the puzzle can be found in Appendix A. In this puzzle, students must use the given pieces to create one

continuous path. Challenge cards in the game designate the pieces that should be used to create the path and the level of difficulty indicated on the cards ranged from beginner to expert. The intermediate-level cards were used for this experiment to provide an adequate amount of challenge in the task.

During the first pilot study, it was determined that the beginner-level cards were too easy and solved too quickly. During the second pilot study, the intermediate cards worked well, challenging a majority of the students but not pushing them to a threshold of frustration that made the task seem impossible (King, 2009). All students received identical cards for practice and attempted the same post-test card; the card that was chosen as the post-test card was very similar to the cards they solved during their practice session.

Quantitative Measures

A number of data sources were collected and analyzed during this research. Each of the quantitative measures is discussed in the following section.

Demographic Variables

The students' demographic information was gathered from their current school records. This information was limited to age, gender, and ethnicity.

Goal Orientation Measure

The students' goal orientation was measured before and after the task using subscales from the Patterns of Adaptive Learning Scales (PALS; Midgley, 2002). The 10 items selected came from the revised personal achievement goal orientation section of the survey for students. The mastery goal orientation (MGO) subscale comprised five items,

such as “One of my goals in class is to learn as much as I can.” The performance approach goal orientation (PGO) subscale also comprised five items including statements, such as “One of my goals is to look smart in comparison to the other students in my class.” Students rated themselves on a Likert scale from 1 (Not at all true) to 3 (Somewhat true) to 5 (Very true). These subscales were chosen because they best fit with the two categories of goal setting addressed in this study and because the scales have been used widely in motivation research (Urduan & Midgely, 2003). The Cronbach’s alpha for the two scales were .85 for the MGO and .89 for the PGO, indicating a high level of reliability. The entire measure with both subscales is available in Appendix B1.

Self-Efficacy Scale

The students’ self-efficacy was measured before, during, and after the practice session using a scale that asked them to rate their ability to complete the puzzle. Originally developed by Zimmerman and Kitsantas (1997), the instrument asks, “How sure are you that you can complete this puzzle?” The original measure ranged from 1 to 100 with 10-unit intervals; however, the pilot studies conducted by the researcher with elementary school students showed that modifying the scale to range from 1 to 10 points in 1-unit intervals was easier for the students to comprehend (King, 2009). To further clarify the scale, descriptions were provided to accompany the intervals of the scale: 1 (not sure), 4 (somewhat sure), 7 (pretty sure), and 10 (very sure). The original scale was tested and shown to have an inter-item reliability of .89, according to Cronbach’s alpha test. A copy of the scale is in Appendix C1.

Self-Reaction Scale

The students' self-reaction was measured after the task using a single-item scale that asks them to rate their satisfaction with their performance solving the puzzle. This scale was also developed by Zimmerman and Kitsantas (1997), and it asked, "How satisfied are you with your performance solving puzzles today?" This scale also ranges from 1 to 10 points in 1-unit intervals. To further clarify the scale, descriptions accompanied intervals of the scale: 1 (not satisfied), 4 (somewhat satisfied), 7 (pretty satisfied), and 10 (very satisfied). The entire scale is in Appendix C2.

Task Interest Scale

To assess the students' interest in completing the puzzle, the researcher had the students complete two scales. The first scale asked the students to rank their preference for working on the brain teaser on a scale of 1 to 5 in comparison to four other familiar activities: *chess*, *Scrabble*, *Mancala*, and *checkers*. The rank of 1 indicated their favorite activity, and the rank of 5 indicated their least favorite activity. This scale was also modified from the work of Zimmerman and Kitsantas (1997). Based on the data from a pilot study conducted with 64 fourth-grade students, a second task interest scale was added (King, 2009). This second scale asked the students to rate how interested they were in solving the puzzle on a scale from 1 to 10 with 1 being not interested and 10 being very interested. Both parts of this scale are located in Appendix C3.

Attribution Scale

When students encountered difficulty between their second and third attempts to solve the puzzle, they answered the following questions: "Why do you think you couldn't

complete the puzzle?” and “What can you do to improve your performance?” The students’ written answers were then grouped according to the reason they cited as the cause of their insufficiency: type of strategy, amount of effort, amount of practice, level of ability, “I don’t know,” or “other.” The questions from this scale came from the work of Zimmerman and Kitsantas (1997), and the entire instrument can be found in Appendix C4.

Puzzle Scores

At the end of the practice session, each student was given another puzzle card to solve as a post-test. The students were reminded “to do their best” and given three minutes to try and solve the card. The three-minute time limit was chosen based on the data from the pilot studies because it was enough time for many of the students to complete the card and provided a standardized post-test experience for all participants (King, 2009). At the end of the time allowed, the number of puzzle pieces completed by each student were recorded and used as their score for solving the puzzle. The highest possible score for the post-test is 8, representing the eight possible pieces that were shown on the puzzle card. Scores could range from 1, which means no pieces were connected to the initial puzzle piece, to 8, which means the puzzle was correctly completed (King, 2009).

Qualitative Measures

In addition to the quantitative data sources that were collected during this research, qualitative measures also provided data for analysis. Those sources, including researcher memos and focus group interviews, are described in detail in this section.

Researcher Memos

Memos, or analytic notes taken during the course of research, were used as a way to continually analyze the process of collecting and interpreting data during this research, to help make sense of the observations collected during the experiment, to develop questions for the focus group interviews, and to clarify patterns that surface in the interview transcripts (Glesne, 2006). These memos also served as a means of checking for validity threat. When re-examining the quantitative data after making memos about the interview transcripts, alternative hypotheses that emerge from those focus groups were considered and ruled out (Maxwell, 2005). An excerpt from the note-taking guide is found below in Table 1. The template from the note-taking protocol can also be found in Appendix D.

Table 1
Excerpts from Researcher Memos

What I See	My Reactions	What else is going on?
Students in this group are showing more physical reactions than I've seen before—AB is tapping his finger, MG is twisting a piece of her hair, and JC's leg is bouncing.	The students seemed really stressed and agitated during the practice session and while attempting the post-test card. Is this a result of the outcome goal orientation? I really felt an urge to comfort or calm them down as I watched them work.	The group was late arriving, so they could be feeling anxious about running late and worried about getting to their lunch period on time. The unfamiliarity with me and the situation could also be playing a part in their response.

Focus Group Interviews

After the puzzle experiment concluded, three students from each of the five groups were randomly selected to participate in focus group interviews. The puzzle groups were: (a) outcome goal with no self-monitoring, (b) outcome goal with self-monitoring, (c) process goal with no self-monitoring, (d) process goal with self-monitoring, and (e) control group (no goal setting or self-monitoring). Because sixth graders do not often talk openly with adults, a focus group format was chosen for the interviews. To maximize student interaction and still keep the group size manageable for note-taking, five-member groups were chosen as the format for the focus group interviews.

Pilot testing showed that the participant interaction generated in a focus group session provided richer, more abundant data as the responses generated by one student were often followed up on and elaborated by another student (King, 2009). Furthermore, participants in the pilot research spoke easily about connections to their home experiences; questions for the focus group sessions capitalized on that by asking students to think about their experience solving the puzzle and relate it to other experiences they may have had with goal setting and self-monitoring at home (King, 2009). Questions such as “What was the most challenging part of completing this puzzle?” and “Can you explain a time outside of school when you’ve had to use a goal-setting strategy?” were asked. A mix of closed and open-ended questions were used to provide a structure that encouraged the group to stay centered on the topic, but allowed flexibility to follow the

students' thoughts as they arise in the discussion (Weiss, 1994). Questions used for the focus groups can be found in Appendix E.

Procedures

The researcher conducted the study during the school day in the participants' normal school setting. Initially the researcher met with the entire group of participating students to introduce herself, answer questions the students had about the study, and pass out the required consent and assent forms. The next week, those students who returned signed forms completed the initial goal orientation measure with their homeroom teachers. A few weeks later, the students met with the researcher in groups of three to learn the puzzle strategy, practice the puzzle, complete the post-test and answer the questions on each measure. Table 2 displays the timeline of this study.

Table 2 *Research Study Timeline*

Time Frame	Research Process
Spring 2008–Summer 2008	Pilot study #1
Fall 2008–Spring 2009	Pilot study #2
June 2009–October 2009	Review and refine questions
November 2009	Researcher memos written about the goals of the study
December 2009	Initial meeting with students Consent forms obtained Initial goal orientation survey administered
January 13, 2010–March 24, 2010	Puzzle groups met All additional measures completed Researcher memos completed
March 25–April 7, 2010	Focus group interviews held
April–June 2010	Statistical analysis completed Qualitative data coded
Fall 2010	Complete dissertation

Before beginning the study, all the proper permissions, including those from the George Mason University Human Subjects Review Board, the school district's Department of Research Screening Committee, the principal of the school, the parental consent, and the student assent were obtained. This process, begun in August, was completed in November. The approved consent forms (Appendix F1, F2) were sent home in the students' weekly school folders before Thanksgiving, and three weeks later, the

researcher had received the 70 consent forms that were needed to ensure each group in the puzzle experiment had a sufficient number of participants. Those students who returned the forms were assigned a participant number and will be referred to in this study by pseudonyms to protect their privacy.

The researcher conducted two pilot studies with elementary school students in preparation for this dissertation study and through those studies determined that three students were an ideal number for each puzzle group (King, 2008, 2009). While none of the pilot study subjects were in the current study, the choice of three students per group allowed for the data to be collected more efficiently than in a one-on-one situation, and it provided the researcher with sufficient observation notes for each student participating to have a faithful rendering of each puzzle group's experience. To make up the 2 x 2 factorial design of the study, the sixth-grade participants were randomly assigned to groups of three, and there were five groups of three students in each of the four experimental conditions and the practice-only control group. This provided a total of 15 students in each group and an initial total of 75 student participants all together; however, during the course of the study the participant pool was reduced to 70 due to student absence and language barriers. Each of the student groups met with the researcher in a quiet room of the school library to complete their puzzle session.

During the first 10 minutes of the session, all groups were taught how to solve the new brain teaser puzzle. In this lesson, the students were given explicit instructions in a strategy that could help them solve the puzzle, and all groups received a copy of the steps

during this instruction. As soon as the lesson was completed, the students were given the first self-efficacy scale to complete before beginning the practice session.

During the next 10 minutes, students practiced the task. The researcher observed the groups during this time, making notes about the students' demeanor, affect, and time on task, and watching for when the students encountered difficulty. When a student had difficulty with a puzzle card even after making a second attempt to solve it, they completed the attribution scale. All students completed this scale in a staggered response fashion, as each student encountered difficulty at a different point during the practice session.

At the five-minute mark of the practice session, the self-efficacy scale was administered a second time and practice continued. At the end of each practice session, all groups were shown the puzzle card they would solve as a post-test; this card was almost identical to the cards they had been practicing. After seeing the post-test card, all groups completed the self-efficacy scale a third time. Groups were then given three minutes to solve the post-test. As soon as that time was up, all groups completed a self-reaction scale, a task interest scale, and the second goal orientation survey.

After the general instructions were given to all groups, the experimental groups were directed to set a process goal or outcome goal before the practice session began. The following operational definitions for the two types of goals were implemented: students assigned to the process-goal groups were told to focus on the steps they were taught during the practice period, and students who were assigned to the process-goal group that were also in the self-monitoring group were asked to record their strategy use by

checking off the steps as they completed them. Students assigned to the outcome-goal groups were told that to do well, they should try to get as many of the pieces correctly placed as possible and to complete as many practice cards as possible. The students who were assigned to the outcome-goal group that were also in the self-monitoring group were asked to record the number of practice cards they completed by keeping a tally of their successful attempts.

Intervention

An initial strategy lesson introduced the students in all groups to the instructions for the puzzle. During this lesson, the researcher went over a checklist that outlined each of the steps required to solve the puzzle, demonstrating and modeling these steps for all of the students in the study. Each group was allowed to ask questions at the end of the lesson and was asked to do their best on the puzzle. After this lesson, students in the experimental groups were given further directions, as outlined below. The strategy checklist can be found in its entirety in Appendix G.

Process-Goal Group Instructions

In addition to the initial strategy lesson, the process-goal groups were directed to refer to the checklist as they solved the puzzle. These students were told that doing their best on the puzzle meant paying attention to the steps as they completed the puzzle and focusing on that process of solving it as they practiced.

Outcome-Goal Group Instructions

In the outcome-goal groups, students were directed to focus on correctly solving each card and getting as many practice cards completed as they could. These students

were told that doing their best on the puzzle meant correctly completing as many cards as possible during the practice session.

Self-Monitoring Group Instructions

Half of the groups in each of the two goal orientation categories were instructed to monitor themselves in order to keep track of their progress during the practice session.

The process groups that self-monitored were directed to check off each step on the checklist as they solved each puzzle card. The outcome-goal groups that self-monitored were directed to keep a tally of the number of cards they completed during the practice session.

Practice Session

During the practice session, the students were given sets of practice cards and puzzles. Based on observations completed during the pilot study, 10 minutes was determined an ideal amount of time for the students to practice. This amount of time seemed long enough for the students to learn the puzzle, but not so long that they became disinterested (King, 2009). The students were told they had 10 minutes to practice the puzzle and that they could complete the cards in any order they wished. They also were told that the researcher was taking notes as they worked and that she may want to talk to some students to gain a better understanding of how they were solving the puzzle during the practice time. They were then reminded to focus on their puzzles and the instructions they were given.

Post-test Session

At the end of the practice session, students were asked to show how much they had learned about solving the puzzle by attempting to complete one last puzzle card in three minutes or less. The students were told that during this three-minute period the researcher could not answer any questions, and they were asked to do their best to solve the puzzle. Then, before the post-test began, the students completed a third self-efficacy scale. During the three minutes of the post-test, the researcher observed students' body language and demeanor as they engaged in the task. After the three minutes were up, the researcher noted which students had successfully solved the puzzle and recorded how many pieces each student completed. The students then completed the self-reaction scale, the task interest scale, and another copy of the original goal orientation measure with the questions arranged in a different order. This is found in Appendix B 2.

Focus Group Interviews

After the puzzle sessions were completed, three focus group interviews were scheduled. Each of the five member focus groups were composed of students that participated in the original puzzle groups: the control group, the process-goal group with self-monitoring, the process-goal group without self-monitoring, the outcome-goal group with self-monitoring, and the outcome-goal group without self-monitoring. Three students from each of the five groups were selected through purposeful sampling that ensured the focus groups would contain a mix of cultural backgrounds that resembled the overall mix of backgrounds included in the entire study.

The resulting focus group included three Caucasian students, three African American students, six Hispanic students, one Asian student, and two students of mixed

ethnicities. These students were then grouped into three focus groups containing five students each. Groups were created based on students' schedules in order to prevent disruptions to their learning.

Table 3 provides an overview of the interview participants, showing their ages, their ethnicity, their gender, and their group placement during the puzzle session; a brief narrative snapshot of each participant is presented after the table.

Table 3 <i>Students Participating in the Interviews</i>				
Control Group	Process w/Self- Monitoring	Process w/o Self- Monitoring	Outcome w/Self- Monitoring	Outcome w/o Self- Monitoring
SB, 12 Caucasian Female	PR, 11 Hispanic Female	DM, 12 African American Male	SL, 12 Mixed Ethnicity Male	AA, 12 African American Male
DD, 12 Mixed Ethnicity Male	JS, 12 Caucasian Male	SG, 11 Hispanic Female	JE, 12 Hispanic Male	MG, 11 Hispanic Female
TF, 11 Hispanic Female	AN, 12 Asian Male	AC, 12 Caucasian Female	QP, 12 African American Female	RR, 12 Hispanic Male

SB was a 12-year-old Caucasian girl, the only child in a single family home with a working mother. She mentioned grades frequently in her discussion of goals, and she was very quiet at the start of the focus group.

DD was a 12-year-old boy of mixed ethnicity who was one of 10 brothers and sisters in a home that was filled with relatives. He loved athletics and spoke a great deal about his goals for various sports.

TF was an 11-year-old Hispanic girl who was the youngest in her family of four. She lived with her mother, father, and older brother, and spoke often about her goals for her family, not just of her goals for herself, which centered on good grades and soccer. Even though she was the youngest, she mentioned helping her brother stay organized at home.

PR was another 11-year-old Hispanic girl. She was an only child living with her mother, father, and a number of other relatives. She mentioned family responsibilities after school including helping around the house and caring for pets. She stated that she found school challenging, and her goals were focused on getting better grades.

JS was a 12-year-old Caucasian boy, the oldest child in a family of four. Living with his mother, father, and a little sister, he mentioned his mom helping him stay organized, and his dad helping with homework. He, like DD, loved sports and had goals focused around athletics.

AN was a 12-year-old Asian boy, the middle child in a family with 5 children. He mentioned caring for his younger siblings and getting help with homework from an older sister. He also really liked to play sports with his older brother on weekends and set goals to improve in that area by keeping track of the strategies he used to beat his brother.

DM was a 12-year-old African American boy. He had been elected president of his elementary school student body and mentioned setting goals based on future

leadership. He spent a lot of time in the afterschool program and reported getting help on his homework from his older sister and his father.

SG was an 11-year-old Hispanic girl who had an older sister and lived with lots of family members, whom she talked about spending time with after school. She loved reading and social studies and talked about working hard to keep track of all her school work.

AC, a 12-year old-Caucasian girl, was an only child with divorced parents. She mentioned strategies for staying organized between the two homes in her discussion about using self-regulation strategies outside of school. She was very busy after school, participating in a number of musical groups and sports.

A 12-year-old boy of mixed ethnicity, SL was an only child living with both his mother and father. He spoke a great deal about his love of soccer, the travel team he played on, the amount of soccer practice required, and the strategies he used to keep up with homework.

JE, a 12-year-old Hispanic boy, was the youngest child in his family with one older sister who helped him with his homework from time to time. “Not often,” he said, because he hated school and avoided doing homework whenever possible. JE cracked jokes constantly during the focus group session and talked about his strategy to make the honor roll by wallpapering his room with his report cards.

A 12-year-old African American girl, QP mentioned living with her mother, her mother’s boyfriend, an older brother, and a younger brother. She loved to talk about her siblings and spent some time after school taking care of her younger brother. She spoke

about her goals to be a scientist or writer, and she explained that she received help from her teachers after school if she needed it.

AA was a 12-year-old African American boy, the only child of a single mother. He mentioned a number of chores he did around the house after school and being a BMX biker as his goal. He stated he did not set goals for school because he did not really like school, but he mentioned his mother's goal for him would be to get good grades.

MG was an 11-year-old Hispanic girl. An only child, she mentioned getting help with school work from her mom and dad on a regular basis. Her goal for herself centered on getting good grades, and she was very proud of getting all As in school thus far.

RR, a 12-year-old Hispanic boy, had one older sister and lived with his mom and dad and one uncle. He was a very verbal participant in the groups and talked about liking math, especially when he was the first one finished. His goal, so he said, was to always win at Tic-Tac-Toe and he had been keeping track of how many games he won.

The focus group interviews were held in a room located in the school library; this allowed for a quiet setting with minimal distractions. During the 30-minute focus group sessions, a series of semi-structured questions (Appendix E) were used to elicit students' thinking about their puzzle experience and their perceptions about their home experiences with self-regulation. The semi-structured nature of the questions allowed for follow-up with ideas that surfaced during the course of the interviews. Sample questions included: (1) Can you describe your experience completing the puzzle? and (2) What did you do when you got stuck? Other questions, such as (3) What do you do when you have a large amount of homework or a big project due?, and (4) Do you feel you get help with your

homework at home; if so, who helps you?, inquired about the students' use of the self-regulatory strategies used outside of the puzzle experience. These questions also sought to gain some insight into the students' home experiences with self-regulation and determine if there were any commonalities in those experiences or in the characteristics of the students that reported high levels of efficacy. Additionally, during the course of the interviews, the researcher validated the students' responses by involving the students in member checks to verify the accuracy of new ideas as they were presented. By paraphrasing some of the students' responses, the researcher was able to check for nonverbal cues such as head nods or obtain verbal affirmations from the students before moving forward in the interviews (Maxwell, 2005).

Quantitative Data Analyses

The Statistical Package for Social Science (SPSS) 16.0 was used for all quantitative data analysis. After the researcher entered the data collected during the puzzle group meetings into the program, the resulting data set was checked for any missing data points or outliers. The descriptive statistics of the data were computed to get a general picture of the results, enabling the researcher to determine that the necessary assumptions of normality and equal variances were met.

The data were then analyzed using inferential statistics. The dependent variables being tested were puzzle-solving skills, goal orientation, task interest, self-efficacy, and self-reactions. The mean and standard deviations were computed for each group on each of those variables, and a Factorial Analysis of Variance (ANOVA) was run to determine if there were any significant statistical effects for the experimental groups and the

dependent variables. Independent *t* tests were also run to examine difference between the control group and the experimental groups.

The relative effects of the independent variables (goal setting and self-recording) on task interest were calculated using ANOVA, and post-hoc tests were used to follow up on any of the ANOVA tests that found significant effects. In addition, a Pearson correlation analysis was used to more closely examine the relationships between the dependent and independent variables, and possible interaction effects were examined.

To determine differences in attribution, a frequency chart was completed for each experimental group and the control group to look for any commonalities of attributions within each group and a point-biserial correlation was run to test how closely the main attributions predicted other outcomes.

Qualitative Data Analysis

Two types of qualitative data were collected during the course of this study: interviews and researcher memos. The researcher's perspective and the process used for analyzing this data is briefly described below.

Researcher's Perspective

This section presents the researcher's background experiences that influenced the analysis of the qualitative data. As a mother and educator for a number of years, the researcher holds a number of beliefs around the area of education and the influence of family, which are deeply embedded and may have shaped the way the data were interpreted.

As an educator with a firm belief in constructivist learning, the researcher's ways of thinking were complemented by Social Cognitive Theory. Additionally, her years of experience watching students struggle with challenging work fostered a firm belief that students need self-regulatory strategies to be successful in school. That positive view of self-regulatory strategies may have shaped the way the researcher viewed the students' responses, so that assumption should be acknowledged here.

In addition, having done pilot studies looking at teaching self-regulatory strategies, the researcher made an assumption that the boys and girls would perform equally well during the puzzle task and employing the self-regulatory strategies used in this study. No differences were found in the previous pilot research, and the researcher made the assumption that no difference would exist within this group as well.

The researcher is also a daughter, sister, and mother, and her experiences with family have developed a strong belief that interactions within families and the experiences students have with their families can make a difference in the way students perceive themselves, which could influence their self-efficacy. This same experience coupled with her experience in the classroom also lead the researcher to assume that families can influence the development of the students' self-regulatory skills. Careful memos were taken during the process of collecting data so the researcher would keep these perspectives and assumptions in mind as the interviews were conducted and analyzed.

Interviews

The focus group interviews were audiotaped and transcribed verbatim by a colleague of the researcher who is currently employed as a transcriptionist for a local law enforcement agency. Once the transcription was completed, the researcher read through the transcriptions while listening to the interview recordings to ensure the transcripts were a faithful rendition of the interview sessions. To further validate the data, these transcripts were compared with the puzzle data and the puzzle observation notes collected for each student interviewed. This triangulation of the data helped confirm that the interview transcripts were a coherent and cohesive account of each student's experience (Maxwell, 2005).

The resulting body of qualitative data was analyzed using an issue-focused approach (Weiss, 1994). The process included coding, sorting, and integrating themes that emerged from this data. Additionally, the interview data from the students in the focus groups was compared with their individual puzzle group data, and each group's data was combined and analyzed for trends with each group. Finally, commonalities in themes were sought among students who reported high levels of self-efficacy to discern if any trends could be linked back to the students' home experiences.

The process of analyzing data actually began in the interview planning stage of the project. As the interview protocol was finalized, the researcher reflected on the questions that were chosen and efforts were made to ensure the questions referred back to the big picture of the research goals. The notes from each interview were also sources of

data for analysis and helped determine if any of the questions needed modifying before the next focus group (Weiss, 1994).

Once the transcriptions were completed, they were read from start to finish for open coding. Codes from the first reading included ideas such as challenge; challenge was a word used by students when they talked about the difficulty of the puzzle or how it feels when they are faced with a great deal of homework. On a second reading, post-it notes helped capture ideas and phrases mentioned frequently, and markers were used to color-code those words and ideas in the text. Such words as fun, challenge, difficulty, and strategies were often used by the participants. This first open-coding session was spent looking for those things, and two fellow PhD students, from differing fields of expertise, also coded the transcripts to provide inter-rater reliability and make sure the codes that were found were not simply ones that the researcher was hoping to find. The percent of agreement between the coders was 92%, and after examining the points where coders did not agree, codes noted by two of the three coders were kept for further analysis (Weiss, 1994).

Going backward to move forward. The resulting codes were then sorted using elements defined as self-regulatory behaviors as a lens. For example, goal setting and self-monitoring were the focus of the experimental piece of this study, so the codes were sorted and examples sought for aspects of the interviews that related to those two themes. After integrating the data and finding examples to support the codes that the literature suggested, the resulting themes seemed forced. Trying to understand the students' experiences by looking at their self-regulatory strategies and metacognitive adaptations

just did not seem to represent the students' voices or their understanding of the experiences we were discussing, so a more interpretive analysis was needed.

Going back to the students' words, the next step was to take the "experience-distant" concepts like self-reactions and self-efficacy and replace them with their "experience-near" concepts like confidence and frustration (J. A. Maxwell, personal communication, November 16, 2008). Originally, the idea was that an etic approach would be considered appropriate for understanding the topic of self-regulation. Once the data was analyzed this way, however, it became clear that a better understanding of how the students defined the structures and strategies that make up self-regulation was needed to understand how students' approached the puzzle task. What were the emic terms they used to negotiate the meanings of those things? How did they make sense of the puzzle-solving experience, and did it relate back to other experiences they had? This reflection led to another coding session that was aided by the creation of an Excel spreadsheet listing all each of the students' responses in a separate cell so they could be sorted multiple ways.

Researcher Memos

All memos from the puzzle experiment and follow-up interviews were coded to look for prominent themes that emerged. A matrix of these codes was created, and the researcher looked for patterns in these codes within and between each of the experimental and control groups. The notes from each puzzle session were also reviewed to look for any potential patterns between the students who were successful in completing the puzzle and those who were not. The same procedure was followed to look for patterns among

students who scored the highest on the self-efficacy measures as well those who scored the lowest. An example from this matrix is listed below in Table 4.

Table 4

Excerpt from Researcher Memo Matrix

ID	Group	SE Scores	Puzzle Notes	HW Approach	Home Help	Task Interest	Attributions	Current Goals
SG	1	9, 8, 7	Early Success; Later Struggle 4 cards complete	Break it up	Maternal Paternal, Organizing Homework completion	Yes	Lack of strategy use	Grades, Test results, Sports

Note. SG is a student code denoting one interview participant. This table is a rendering of field notes taken on March 24, 2010.

Validity and Bias

The measures used in the quantitative portion of this research were all tested in previous research and proven to be reliable. The two PALS subscales had a Cronbach's alpha of .85 for the MGO and .89 for the PGO. The self-efficacy scale was used in previous research and shown to have an inter-item reliability of .89; it was given during this study three times as an added measure of internal validity (Zimmerman & Kitsantas, 1997). The self-reaction scale and task interest scales were modified from previous research studies (Zimmerman & Kitsantas, 1997), and the adaptations of these scales were both refined during pilot testing to help increase their reliability with the younger population involved in the current study.

As an additional measure of validity, the quantitative data from the focus group interviews were used to review the individual student results from the experiment to check for congruency between the notes and codes from each student and their performance and scores on the given measures. This triangulation of data provided a measure of validity for the students' quantitative and qualitative data and yielded some insight into how the process of self-regulation was developing in that student.

Though researcher bias is a given part of qualitative data, efforts were made to address the validity of the qualitative results and reduce researcher bias. In coding the researcher memos and transcripts, two colleagues independently coded the qualitative data collected, and the results were compared with the researcher's initial codes to add inter-rater reliability and prevent the researcher from being limited by her passion for this topic and only seeing what she wanted to see.

An example of the codes found for questions about whether or not students perceived they received help with self-regulation at home included maternal help, paternal help, siblings help, extended family helps, no one helps, lots of involvement, little involvement, no involvement, seen as helpful, seen as unhelpful. Researcher memos were kept during this research process, and these memos were consulted often to ensure the accuracy of recollections made by the researcher in the analysis process. Finally, alternative hypotheses were considered and checked against both the quantitative and qualitative sets of data before deciding on one interpretation of the results. For example, when it appeared that students in one group were feeling frustrated because of the outcome-goal orientation condition, some of the alternate hypotheses were that students

were worried about getting to their next period on time, or that they were feeling rushed because they had arrived late.

Chapter 4. Results

Introduction

The overall aim of this study was to better understand self-efficacy as it is manifested in selected sixth-grade students, and to find out if the self-regulatory strategies of goal setting and self-monitoring made a difference for the students in the study as they solved the puzzle. More specifically, the quantitative data was analyzed in an attempt to answer the following questions:

1. Is there a main effect for goal setting on the students' performance, goal orientation, interest in the task, self-efficacy, and self-reactions?
2. Is there a main effect for self-monitoring on the students' performance, goal orientation, interest in the task, self-efficacy, and self-reactions?
3. Is there an interaction between goal setting and self-monitoring on the students' performance, goal orientation, interest in the task, self-efficacy, and self-reactions?
4. Do students' attributions regarding their failure to solve the puzzle differ across the goal-setting and self-monitoring conditions?

The qualitative data was analyzed using an issue focused analysis (Weiss, 1994) in order to answer the following questions:

5. How do students approach the puzzle task when given an outcome goal and does that approach differ from the ways students approach the task when given a process goal?
6. What characterizes the experiences of students who show high levels of self-efficacy and is there any evidence of cultural influences in these factors?

Data Collection

The students participating in the study took an initial goal orientation survey with their teachers in December at the beginning of the day during their homeroom period. They were then randomly assigned to one of five puzzle groups: the control group, the process goal-setting group with no self-monitoring, the process goal-setting group with self-monitoring, the outcome goal-setting group with no self-monitoring, or the outcome goal-setting group with self-monitoring.

A schedule of the groups' meeting times was set up with the host school to ensure compliance with the students' academic needs. Beginning in January 2010, it was planned that each group of students would meet with the researcher for one 30-minute block during their homeroom class period on Wednesdays, Thursdays, and Fridays for a total of 25 group meetings that were completed during approximately 14 hours of student meetings.

Once the initial schedule was finalized, all of the homeroom teachers responsible for students involved in the research were notified and provided with the schedule. This schedule, however, had to be modified in light of the record snowfall that occurred during early February. A number of school schedule shifts resulted from the large number of

snow days; this delayed the data collection process and the puzzle group meetings took more than three months to complete. The final schedule of group meetings can be found in Appendix H.

When the puzzle groups got underway, students met with the researcher in a study room located in the school library. At the beginning of each puzzle group meeting, the students participating signed their own consent form (Appendix F2) and were given the opportunity to withdraw from the study at any time if they so chose. A few of the students were absent on their puzzle session day, so data collection included 72 of the original 75 students.

During the puzzle group meetings, the researcher noticed that two of the students participating spoke very little English. This did not seem to impact their ability to complete the puzzle; however, when the researcher was cleaning the data and checking for homogeneity in order to run the parametric tests that were necessary for data analysis, those students' scores stood out because their answers were not in the same range as all the others. As a result, those students' scores were determined to be outliers. The question of validity and the small sample size led to a decision to remove these scores. Once the outliers were removed, a total of 14 students remained in each of the puzzle groups, for a final sample size of 70 students.

A variety of quantitative data was collected as students each completed three self-efficacy scales (before, during, and after the puzzle practice session), a self-reaction scale, a task interest measure, and two goal orientation surveys (one well before and one just after each puzzle session), as discussed in chapter 3. Qualitative data was collected as

the researcher made notes of students' reactions and comments during each puzzle session. For example, when the students experienced difficulty during the puzzle sessions, the researcher asked what they believed caused the difficulty. Finally, focus group interviews were conducted with 15 randomly assigned students after the puzzle groups were completed. The transcripts from the interviews provided further qualitative data that was then analyzed and compared with the quantitative data provided by each student.

The chapter is subdivided into quantitative and qualitative sections and shows the findings for each research question in turn. The following sections will explain how the data were analyzed.

Quantitative Findings

The descriptive statistics of the data were run using SPSS 16.0 to get a general picture of the results, allowing the researcher to determine that the necessary assumptions of normality and equal variances were met. The means and standard deviations of all measures for all experimental conditions are shown in Table 5.

Table 5

Dependent Measure Means and Standard Deviations for Each Experimental Group

Dependent measure	Control group	No self-monitoring experimental group		Self-monitoring experimental group	
		Outcome goal	Process goal	Outcome goal	Process goal
Puzzle performance					
<i>M</i>	3.79	3.64	4.71	4.14	4.79
<i>SD</i>	1.63	2.13	1.59	1.29	1.05
Mastery Goal (pre)					
<i>M</i>	4.59	4.50	4.44	4.51	4.64
<i>SD</i>	.43	.52	.43	.46	.32
Mastery Goal (post)					
<i>M</i>	4.47	4.37	4.43	4.44	4.51
<i>SD</i>	.62	.65	.44	.48	.57
Performance Goal (pre)					
<i>M</i>	3.60	3.34	3.50	3.69	3.44
<i>SD</i>	.89	.99	.79	.72	.83
Performance Goal (post)					
<i>M</i>	3.57	3.33	3.29	3.57	2.87
<i>SD</i>	.82	1.04	.88	1.12	.78
Self-efficacy (pre)					
<i>M</i>	6.00	7.00	7.71	7.14	6.43
<i>SD</i>	2.00	1.71	1.64	2.11	1.16
Self-efficacy (during)					
<i>M</i>	5.21	5.57	6.43	5.07	6.14
<i>SD</i>	1.81	1.91	2.41	2.40	1.66
Self-efficacy (post)					
<i>M</i>	5.79	5.29	6.86	5.21	6.36
<i>SD</i>	2.04	1.86	1.83	2.19	1.78
Self-reaction					
<i>M</i>	5.71	5.43	8.00	6.64	6.86
<i>SD</i>	2.02	1.95	1.80	1.34	2.03
Task interest					
<i>M</i>	6.57	6.14	7.43	7.50	8.29
<i>SD</i>	2.24	1.92	2.06	2.31	2.05

Control Group Comparisons

Independent *t*-tests were performed comparing the goal-setting experimental groups and the control groups. The performance of students in the control group was initially compared with both the outcome goal that did self-monitor group and the outcome goal group that did not self-record. There were no statistically significant differences found between the control group and either outcome goal groups for the measures of: puzzle performance, smallest $t(1, 26) = -.19, p = .84$; self-efficacy, smallest $t(1, 26) = -.71, p = .48$; self-reactions, smallest $t(1, 26) = -.38, p = .70$; goal orientation, smallest $t(1, 26) = -.87, p = .50$; or task interest, smallest $t(1, 26) = -.54, p = .59$.

When compared with the process goal groups, however, some differences were found. For the process group that did self-monitor, there were significant differences found for the outcome goal orientation variable, $t(1, 26) = -2.31, p = .03$ and task interest $t(1, 26) = -2.11, p = .05$. In addition, when compared to the process goal group that did not self-monitor, control participants displayed significantly lower self-efficacy, $t(1, 26) = 2.48, p = .02$, and less positive self-reactions, $t(1, 26) = 3.17, p < .01$.

Correlational Analyses

A Pearson correlation analysis was used to examine the relationships between the dependent variables in the first three research questions more closely. The resulting correlations are shown in Table 6.

Table 6 <i>Pearson Correlation Matrix among Dependent Variables</i>												
Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Goal Setting	—											
2. Self-Monitoring	.00	—										
3. Mastery Goal (pre)	.04	-.13	—									
4. Performance Goal (pre)	-.03	-.09	.12	—								
5. Mastery Goal (post)	.06	-.08	.46**	-.07	—							
6. Performance Goal (post)	-.19	.05	-.07	.53*	.02	—						
7. Puzzle Pieces (post-test)	.27*	-.09	.05	.11	-.08	.07	—					
8. Self-Reactions	.36*	-.01	.04	-.09	.18	.02	.20	—				
9. Self-Efficacy (pre)	.00	.17	.30*	.01	.22	-.27*	.06	.34**	—			
10. Self-Efficacy (during)	.23	.09	.14	-.25*	.17	-.15	.12	.44**	.31**	—		
11. Self-Efficacy (post)	.34**	.07	.15	-.11	.15	-.04	.13	.65**	.32**	.47**	—	
12. Task interest	.24	-.26	.26*	-.02	.15	-.16	.14	.39**	.20	.25*	.31**	—

* $p < .05$ ** $p < .01$

There was a statistically significant positive correlation between the students' puzzle performance in the goal-setting condition, $r(n = 70) = .27, p < .05$. The goal-setting condition also correlated with the students' self-reaction score and their post-task self-efficacy score, $r(n = 70) = .36, p < .05$ and $r(n = 70) = .34, p < .01$, respectively.

Students' initial mastery goal orientation scores correlated positively with their initial self-efficacy scores $r(n = 70) = .30, p < .05$ and their task interest in the task $r(n = 70) = .26, p < .05$. However, students' initial performance goal orientation scores correlated negatively with their self-efficacy scores during the task $r(n = 70) = -.25, p < .05$. There was also a significant main effect for self-reaction variable, $F(1, 52) = 8.39, p = .01$, with students in the process goal groups scoring the highest ($M = 7.43, SD = 1.97$), followed by students in the outcome goal groups ($M = 6.04, SD = 1.70$). The control group ($M = 5.71, SD = 2.02$) had the lowest self-reaction score of any of the groups.

Students' self-reaction scores correlated positively with their self-efficacy scores before, during, and after the task: $r(n = 70) = .34, p < .01$; $r(n = 70) = .44, p < .01$; $r(n = 70) = .65, p < .01$; their self-reaction scores also correlated with their task interest in the task, $r(n = 70) = .39, p < .01$. Additionally, the students' task interest significantly correlated to the their self-efficacy scores during and after the task, $r(n = 70) = .25, p < .05$, and $r(n = 70) = .31, p < .01$, possibly showing students were more interested in the task if they felt confident they would be successful and their reaction to their puzzle experience could influence their interest in trying the puzzle again.

Factorial Analyses

After the correlations were examined, ANOVAs were run to determine if there were any significant main effects for the experimental groups. Additionally, the variables of skill solving puzzles, goal orientation, interest in the task, self-efficacy, and self-reaction were examined.

Goal setting. The first research question sought to determine the impact of goal setting on students puzzle performance, goal orientation, interest in the task, self-efficacy, and self-reaction. It was hypothesized that all of the experimental groups would outperform the control group, and that hypothesis proved to be correct for some of the variables measured. For the first variable of puzzle performance, ANOVA showed a significant main effect for goal setting, $F(1, 52) = 4.17, p = .05$, with the control group ($M = 3.79, SD = 1.63$) scoring lower in puzzle performance than the outcome goal orientation groups ($M = 3.89, SD = 1.75$) and the process goal orientation groups ($M = 4.75, SD = 1.32$).

The second variable of goal orientation was divided into a mastery orientation score (MGO) and performance orientation score (PGO). Neither goal orientation showed a main effect for goal setting, $F(1, 52) = .20, p = .66$ for the MGO, and $F(1, 52) = 2.00, p = .16$ for the PGO; and the means across all experimental groups were fairly similar for both goal orientations, as shown in Table 1. A between group comparison of means did not reveal a significant difference in goal orientation based on the students' goal-setting group, $t(1, 54) = 1.42, p = .11$. An examination of the means showed that while students' goal orientations were very similar in the pre- and post-test for the MGO, students in the

process goal groups scored lower on the Post-PGO measure ($M = 3.08$, $SD = .84$). See Table 7 for a comparison of means for the goal orientation variable.

Table 7
Comparison of Means for Goal Orientation

	Goal-Setting Group	Mean	Std. Deviation
Pre-Mastery GO	Outcome Goal	4.51	0.48
	Process Goal	4.54	0.38
Post-Mastery GO	Outcome Goal	4.41	0.56
	Process Goal	4.47	0.49
Pre-Performance GO	Outcome Goal	3.51	0.86
	Process Goal	3.47	0.79
Post-Performance GO	Outcome Goal	3.44	1.08
	Process Goal	3.08	0.84

The analysis of variance did not show a significant main effect for the variable of task interest, although it did approach significance, $F(1, 52) = 3.43$, $p = .07$. Overall, the students in the mastery goal groups reported having a higher interest in the task ($M = 7.86$) than students in the performance goal groups ($M = 6.82$) or the control group ($M = 6.57$).

For the variable of self-efficacy, ANOVA did show a significant effect for goal setting, $F(1, 52) = 6.98$, $p = .01$. Students in the process goal groups scored higher ($M = 6.61$, $SD = 1.79$) than students in the control group ($M = 5.79$, $SD = 2.04$), and both of

those groups scored higher than students in the outcome goal groups ($M = 5.25$, $SD = 1.99$).

Self-monitoring. The second research question examined the influence of self-monitoring on the students' puzzle performance, goal orientation, interest in the task, self-efficacy, and self-reactions. In terms of puzzle performance, while not statistically significant $F(1, 52) = .46$, $p = .50$, students who self-monitored ($M = 4.46$, $SD = 1.20$) did perform slightly better than students who did not ($M = 4.18$, $SD = 1.93$) or students in the control group ($M = 3.79$, $SD = 1.63$).

For the variables of goal orientation, there were no significant main effects for self-monitoring and MGO, $F(1, 52) = .30$, $p = .59$, or self-monitoring and PGO, $F(1, 52) = .13$, $p = .72$. Furthermore, virtually no difference was found in means between any of the groups. For the MGO, students who self-monitored ($M = 4.48$, $SD = .52$) scored fractionally higher than students who did not ($M = 4.40$, $SD = .54$) or students in the control condition ($M = 4.47$, $SD = .62$). For the PGO, students in the control ($M = 3.57$, $SD = .82$) outscored students who did not self-monitor ($M = 3.31$, $SD = .95$) and students who did self-monitor ($M = 3.21$, $SD = 1.01$).

An examination of the ANOVA results did show a significant main effect for the variable of task interest, $F(1, 52) = 3.9$, $p = .05$, with students in the self-monitoring groups showing the highest score for interest ($M = 7.89$, $SD = 2.18$) over students who did not self-monitor ($M = 6.79$, $SD = 2.06$) and students in the control group ($M = 6.57$, $SD = 2.24$).

Somewhat surprisingly, there were numerical differences in the means showing that the students who did not self-monitor ($M = 6.07, SD = 1.98$) showed slightly higher self-efficacy than students who did self-monitor ($M = 5.79, SD = 2.04$) or the control group ($M = 5.79, SD = 2.04$), although the differences were not statistically significant, $F(1, 52) = .31, p = .58$.

Self-monitoring did not have a significant main effect for the variable of self-reactions either, $F(1, 52) = .01, p = .94$. Differences in means for the variable of self-reactions ($M = 6.75, SD = 1.69$ for students who did self-monitor, and $M = 6.71, SD = 2.26$ for students who did not self-monitor) were slight, although both groups scored higher than the control group ($M = 5.71, SD = 2.02$).

Interactions. The third research question considered the interaction between goal setting and self-monitoring on the students' puzzle performance, goal orientation, self-efficacy, and self-reactions. While there was no significant interaction between the two for the variables of puzzle performance $F(1, 52) = .26, p = .61$, MGO $F(1, 52) = .001, p = .96$, PGO $F(1, 52) = 1.55, p = .22$, task interest $F(1, 52) = .20, p = .66$, or self-efficacy $F(1, 52) = .17, p = .68$, the results did show a significant interaction between goal setting and self-monitoring, $F(1, 52) = 6.01, p = .02$, for the variable of self-reactions. Figure 2 shows a graph of this interaction.

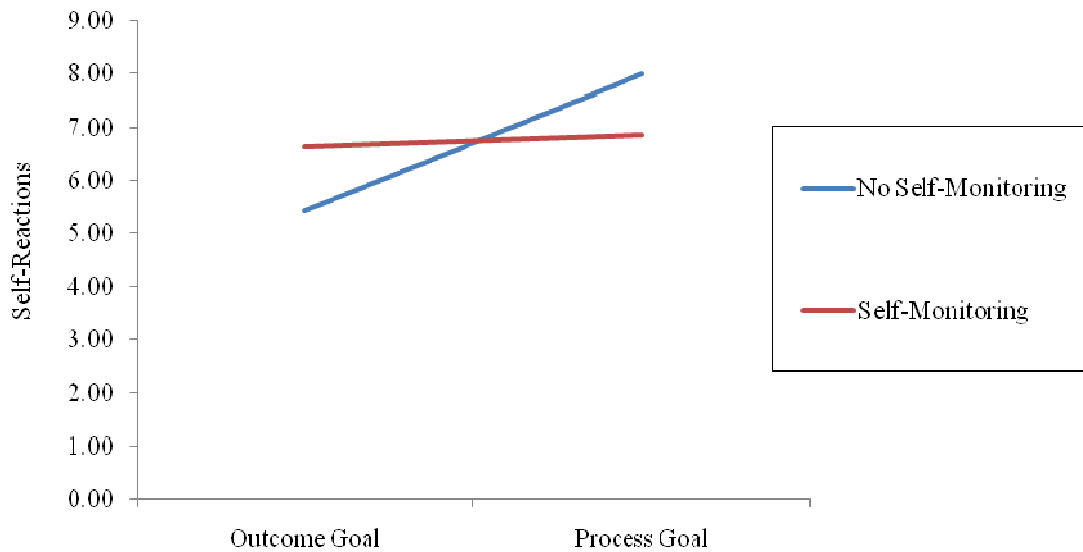


Figure 2. Graph of interactions between goal setting and self-monitoring on students' self-reactions.

Attributions. The fourth research question was used to determine if students' placement in a process-goal group or an outcome-goal group made a difference in the attributions they made when they encountered difficulty. The attributions given by the students were coded by the researcher and two other graduate students; only the codes that were identified by all three raters were used for analysis. Then students' attribution responses were classified into one of six resulting categories: type of strategy, amount of effort, level of ability, amount of practice time, "I don't know," or other (see Table 8). An examination of the number of students in each category showed that students in the process groups were more likely to attribute their struggle to a strategy issue than students in the outcome groups, who cited either a lack of ability or said, "I don't know," when asked about why they were struggling.

Table 8

Attributions for Each Goal-Setting Group (Combined for Self-Monitoring Conditions)

Group	Attribution source					
	Strategy	Effort	Ability	Practice	Don't know	Other
Control	3	3	2	2	3	2
Process	16	4	1	3	2	2
Outcome	0	4	9	1	9	5

Note. Higher numbers indicate more frequent endorsement of an attribution source.

To determine the extent to which the students' attributions regarding other outcomes could be extrapolated to the other dependent measures, point-biserial correlations were calculated by coding the presence or absence of each attribution and the value of the other measures (see Table 9). Students who attributed their struggle to strategy use were significantly more successful in their puzzle performance, and had significantly higher self-reactions and more positive levels of self-efficacy. In contrast, students who did not know why they were struggling displayed lower levels of self-efficacy, and students who attributed their struggle to a lack of ability displayed significantly lower task interest in the puzzle. No other attributions were predictive of other dependent variables.

Table 9

Correlations Between Attributions and Other Dependent Variables

Dependent variable	Attribution					
	Strategy	Effort	Ability	Practice	Don't know	Other
Puzzle Performance	.24 [*]	.15	-.20	-.01	-.11	-.11
Self-reactions	.34 ^{**}	-.05	-.16	.10	-.17	-.10
Self-Efficacy (post)	.24 [*]	.02	-.21	.17	-.25 [*]	.04
Task interest	.10	.13	-.30 [*]	.09	.04	-.05

**p < .01, *p < .05

Qualitative Findings

The fifth research question, “How do students approach the puzzle task when given an outcome goal and does that approach differ from the ways students approach the task when given a performance goal?” and the sixth research question, “What characterizes the experiences of students who show high levels of self-efficacy?” required a qualitative approach and a more in-depth knowledge of individual students participating in the study. To try and answer these questions, the interview data and researcher memos were analyzed using an issue-focused approach (Weiss, 1994).

This approach included coding, sorting, and integrating emerging themes. In order to facilitate the coding process, the data were put into an Excel spreadsheet; every question and response was placed in a different cell. This matrix allowed for multiple

interpretations of the data for further coding and sorting (Maxwell, 2005), and it helped consolidate ideas in order to answer the fourth and fifth research questions. An excerpt from this matrix appears in Table 10.

Table 10
Excerpts from Interview Matrix

What I like to do after school is go to auxiliary gym In the auxiliary gym, I play Fooseball. What I also like to do is either play video games [sic]. The different type, the most favorite [sic] is usually Mario Cart and what I also like to do, I would like to sign up for cooking, but I don't have enough time for that and soccer.	Well, what I do on projects is usually I separate different parts I can do each day and then I do it and then after that I usually get a complete [sic].	Usually it's my sister that helps me because she's in high school. So she helps me keep me organized and everything.	I didn't like it at all. Because it was too hard because we started in like the 18s [sic] and stuff like that the harder parts, and I think I liked the easier parts better because it's going to help my mind think better [sic] and then when I get to the harder ones, my mind's going to be used to it.	I don't know... I just took it apart and restarted everything again.	I don't think I ever kept track of anything at home. Except for I think my homework. I usually keep track of it. And that's it pretty much...I keep track by checking and making sure it's there, that I did it...and that it's fine.
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Note. SL is a student code denoting one interview participant. This table is a rendering of field notes taken on March 24, 2010.

Commonalities Found in the Puzzle Groups

In order to answer the fifth research question about ways student approached the puzzle task in relation to the goal-orientation group they were in, the interview data from the 15 students were sorted into categories based on the students' group placement during the puzzle task, as mentioned above. Three of the students were in the control group, six of the students were in groups that set a process goal, and six of the students were in groups that set an outcome goal. This integration of the data by puzzle group revealed two major differences between students in the outcome-goal groups and students in the process-goal groups. These differences included the students' perceptions of the puzzle and the students' use of strategies during the puzzle task.

Students' perceptions of the puzzle. Two main themes emerged from the students' opinions of their puzzle experience, and those themes were that of encountering challenge and encountering difficulty (shown in Table 11). Students in the process-goal orientation groups referred to the puzzle a challenge, while students in the outcome-goal orientation groups were more likely to describe the puzzle as hard. When looked at more closely, this subtle difference in wording was related to students' perceptions of the puzzle task as it related to their ability to solve it, and their choices when they got stuck.

Table 11
Students' Perceptions of the Puzzle

Encountering Challenge	Encountering Difficulty
PR: ...you had to think in order to solve it. Some of them were a challenge...and some were easy.	JE: ...but the part where I couldn't figure out any of the puzzle...I didn't enjoy that part.
JS: You just find out different ways that you can solve the hard puzzles. You keep trying, that's the point of it, right? To learn not to give up?	AA: I didn't actually like the puzzle because like it was hard to get it, to get the figure you were supposed to do, so...I just quit.
SG: I solved like the harder ones, and I got like these feelings, you know, like I wanted to do the harder ones even more.	SL: ...it was too hard because we started in like the eighteens and stuff like at the harder parts...
AC...it was kind of like running the "Girls on the Run" race where you...have to get to the end before you can stop. It's hard, and you just have to keep going until you get it, and when you get there you're very excited.	RR: I didn't like [the puzzle] at all because it was too hard; we started with the intermediate ones and they were just, just too hard.
AN: It sometimes can be challenging, but if you start doing it over and over again, you can get better at it.	MG: I tried to solve it...see it...look at it a different way. That didn't work. So I just quit.

Note. This table is a rendering of field notes taken March 23-25, 2010.

Almost every student that was interviewed mentioned the idea of encountering challenge or encountering difficulty when asked about their puzzle experience. However, the extent of this seemingly subtle difference between the two themes was only apparent when the data was examined by experimental group placement. For example, DD reported, “I thought the puzzle activity as fun. It helped me, helped get my brain thinking” (field notes, 2010). He was in one of the process-goal groups. SL, a student in one of the outcome-goal groups, said, “I didn’t like [the puzzle] at all because it was too hard. We started with the intermediate ones, and they were just, just too hard” (field notes, 2010).

Upon a closer analysis of the transcripts from the process-goal groups and the outcome -goal groups, the observation notes about the students in each group and the accumulated puzzle data from these same students, it was discovered that the only negative comments about the puzzle experience came from students in the outcome-goal groups. These students most often spoke of the puzzle as hard, and when looking back at the puzzle observations and data for those students, it was discovered that a number of them gave up on the puzzle at one point or another during the experiment. AA explained, “I tried to solve it...see it...look at it a different way. That didn’t work. So I just quit.” (field notes, 2010). His articulation of that experience fit with the observation notes of many of the outcome-goal students. These students attempted the puzzle and did well as long as they were successful; when they encountered difficulty and got stuck, they gave up.

Conversely, when the students in the process-goal groups mentioned that the puzzle was hard, they tempered it with the idea of overcoming this difficulty to reach a larger goal (field notes, 2010):

SG: You just find out different ways that you can solve the hard puzzles. You keep trying, that's the point of it, right? To learn not to give up?

AC: ...it was kind of like running the "Girls on the Run" race where you...have to get to the end before you can stop. It's hard, and you just have to keep going until you get it, and when you get there you're very excited.

PR: It sometimes can be challenging, but if you start doing it over and over again, you can get better at it.

These students' responses are indicative of a number of the students in the process-goal groups. Observation notes showed that students in these groups struggled with the puzzle at some point, just like the students in the outcome-goal groups, yet more often than not, they did not give up or characterize the experience as a negative one. Their puzzle data showed higher puzzle performance scores than students in the other groups.

The attribution data gathered for the students supported this dichotomy of themes as well. When the attribution data for students in the focus group interviews were examined, it showed that students in the process groups most often attributed their struggle to a lack of strategy use, and one student stated insufficient practice as his reason for being stuck. The students in the outcome-goal groups could not articulate why they were struggling and answered, "I don't know", or they attributed their struggle to a lack of ability. As AA explained, "I'm just not good at puzzles." (field notes, 2010).

Students' strategy use during the puzzle task. Students' attributions when they were stuck were also part of another difference that emerged when the transcripts were examined by puzzle group. This difference related to the students' use of strategies when they were stuck on the puzzle. While the students in the process-goal groups often referred to a specific strategy that they tried, a majority of the students in the outcome-goal groups could not name a specific strategy. They most often mentioned that they just started over or gave up. For example, PR noted, "I just took it apart and restarted everything again." (field notes, 2010).

Of the six students interviewed that were in an outcome-goal group, three said they did not know what they did when they got stuck, two said they were not good at puzzles, and one simply said that they restarted the puzzle. Additionally, when looking at all of the students' answers to the question, "What did you do when you got stuck [on the puzzle]?" all but one of the "I don't know" responses came from students in the outcome-goal groups. The only other "I don't know" came from a student in the control group.

Conversely, when looking at responses from the process-goal groups to the question of being stuck when working on the puzzle, it was found that many of the students specifically referred to looking back at the steps to solve the puzzle or they mentioned a specific step in the puzzle-solving process. For example, JS said, "...sometimes I would check if I had all the pieces on the card, right? And I'd move them around and then I'd look at the sheet [with the puzzle steps]." When reviewing the data for the six students in the process-goal groups, four of the six students mentioned a specific strategy for solving the puzzle, such as ensuring they had the right pieces (from

step 1 of the puzzle-solving process), starting with the connector pieces (from step 2), or making sure they were connecting the pieces facing inward (from step 5). Table 12 shows the responses from each student during the interview process (field notes, 2010).

Table 12

Students' Use of Strategies During the Puzzle Task

Control	Process		Outcome	
	w/Self-Monitoring	w/o Self-Monitoring	w/Self-Monitoring	w/o Self-Monitoring
SB: "I don't know."	JS: "...sometimes I would check if I had all the pieces on the card, right? And I'd move them around and then I'd look at the sheet [with the puzzle steps]."	DM: "I tried again and again, working harder each time until I got it."	SL: "...I just took it apart and restarted everything again."	RR: "I don't know."
DD: "...I just tried harder..."	PR: "I didn't, well...I didn't check the connector pieces..."	SG: "I looked back at the card so I could make sure I had the right pieces."	JE: "I don't know."	MG: "I just took it all apart and (sigh), I had to start all over."
TF: "I realized we could look back at the steps."	AN: "The pieces weren't connected so they would curve inward...I didn't realize it at first."	AC: "I found the steps to the puzzle and read them again."	QP: "I don't know."	AA: "I'm just not good at puzzles...so, I gave up"

Note. This table is a rendering of field notes taken on March 24, 2010.

Characteristics of Self-Efficacious Students

The sixth research question, “What characterizes the experiences of students who show high levels of self-efficacy, and is there any evidence of cultural influences in these factors?” was explored by creating a profile or snapshot of each student that participated in the focus groups. This profile was created by integrating each student’s interview data, observation notes and puzzle session scores. These profiles were then sorted into groups based on students’ levels of self-efficacy. The profiles were divided into two groups of students: one group who maintained consistently high scores on the three self-efficacy measures during the puzzle experience, and one group who did not consistently score high on the self-efficacy measure throughout the puzzle task. The answers on the self-efficacy scale ranged from 1 (not sure) to 10 (very sure), and after reviewing the range of scores on this measure for all students participating in the puzzle groups, the researcher rated students high in self-efficacy for this measure if they initially scored at least a 7 (pretty sure) on the scale and maintained a score of 5 or greater on subsequent ratings throughout the puzzle experience. Students’ data was then narrowed down to two specific foci: how the students spent their afterschool time, and how students regulated their homework habits.

The focus of the analysis for this question centered on the students’ discussion of their approach to homework and how they handled their afterschool time because this was a familiar topic for students and family influences might be present. Additionally,

pilot studies conducted by the researcher revealed that homework and afterschool time were situations where the students had some control and they could choose to regulate or not to regulate behaviors (King, 2009). This choice also made sense given the data collected with these particular students. When asked about what they did after school, all of the students interviewed mentioned having choice about what to do with their time to some degree.

Strategy use. As the data were analyzed from this perspective, strategy use was a theme that emerged once again. It was discovered that the students who scored higher on the self-efficacy scale consistently cited examples of self-regulatory strategy use in their answers about how they spend their time and how they make decisions about schoolwork. Within the realm of afterschool time, the difference appeared when the students discussed how they handled that time. Students who scored high on the self-efficacy scale often mentioned how they structured their time and cited examples of strategies they engaged in, such as prioritizing tasks. Students who scored lower on the self-efficacy scale rarely mentioned any strategy use at all, and most of the time they simply described activities they pursued for fun. In terms of how they handled times when they had lots of homework to do, high-scoring students mentioned specific strategies that helped them accomplish their tasks, and low-scoring students spoke of their reactions to the situation instead of strategies they may have used. For example, when asked about how he handles times when there is a great deal of homework, JS mentioned, “Usually, I put the nonimportant stuff aside, the nonimportant stuff like playing video games and watching TV [sic]...and like right when I get home, I start my homework so that like once you get

into the day, like you're free to do things you want to do for fun." (field notes, 2010).

More examples of these trends are found in Figure 3.

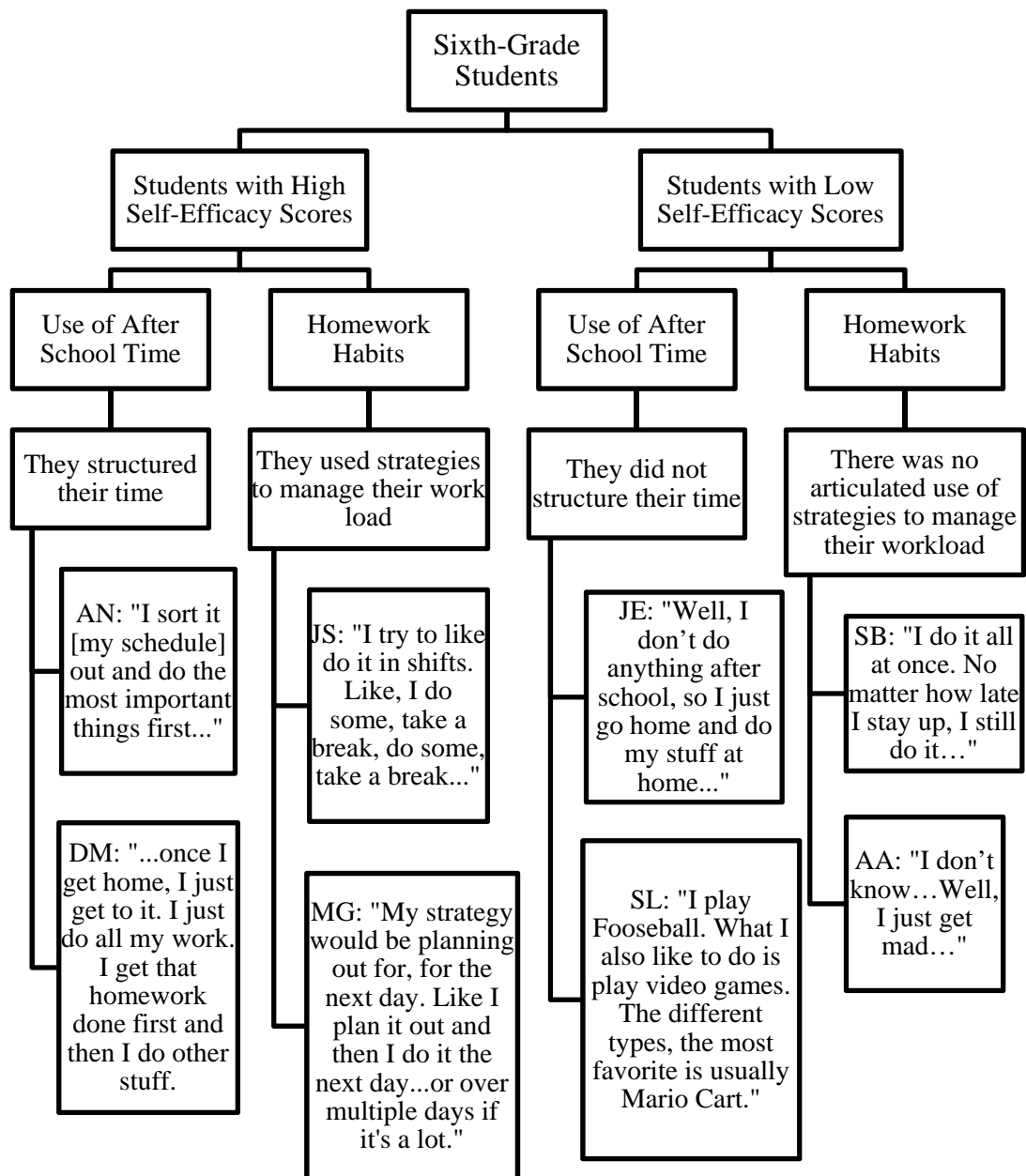


Figure 3. Strategy-usage: Trends from student interviews. Data in this figure comes from field notes taken March 23-25, 2010.

Family involvement. This data from this line of questioning also revealed that some of the students who used self-regulatory strategies were aided by family members to be self-regulated in both their home and academic lives. For example, JS noted that he gets help from his whole family when he has a lot of academic tasks to accomplish: “Usually my parents and sometimes my brothers and sisters help me out when like, I have a big project to do, like I guess the organization....” Others noted no such involvement, like Aaron who replied, “Help? That might’ve been my dad for the first five minutes of my life.”

While the data did support the previously mentioned commonalities and differences in the groups of students who scored high on the self-efficacy scales, it did not support the existence of any clear cultural commonalities among students’ self-regulatory strategy use. In every ethnic group represented in the interviews, there was an example of how families could be involved in helping the students self-regulate in the areas of homework or afterschool time, be it parents or siblings who offered the support. If the students had larger families, siblings were often involved. On the other hand, there were also examples in most groups where students cited no family involvement in their self-regulation of homework or afterschool time. There may have been examples in all groups, but there was only one student with an Asian background in the interview pool and he stated that his older brothers and sisters helped him organize his homework.

Reflections and Additional Insights

In a researcher memo reflecting on the interview experiences, it was noted that there was a lack of data on cultural differences. This lack of data led to a conclusion that a different approach would perhaps have been better at answering the question about cultural differences impacting self-regulatory strategy use, or the potential increase in self-efficacy. A more intensive look at a few students that includes discussions with their families would perhaps yield more insight about the potential influence of cultural differences between these groups of students, and a more focused, case study approach might be what is needed to obtain a clearer picture of how self-regulation and self-efficacy develop in students of this age.

While it was incredibly disappointing to find no cultural connections in the search for understanding about what characterizes students with high levels of self-efficacy, new insights also surfaced when the data from the pilot studies and the dissertation research were analyzed. These insights expanded the researcher's thinking in new ways. For example, when asked about their use of strategies during the puzzle task or in other areas of their lives, a different theme emerged that was not anticipated. Many of the students did not reference any of the cognitive strategies that had been previously discussed, such as goal setting or self-monitoring; instead they discussed strategies to regulate their emotions while they were working or playing. A number of the students' responses indicated that they were not only in touch with how they were feeling during the struggle of solving the puzzle or stress from other life challenges, but they were also in tune with their peers' feelings as well. Their answers showed they knew when to push on and keep

going even though they were frustrated, and they knew when it might be too stressful to continue (field notes, 2010):

SB: I felt like I've been beaten by the puzzle and it's not a good feeling, you know? So I'm trying to do it again. If it gets too hard, I just rest my brain and take a deep breath.

MG: If I get like, overly stressed [with homework] that it's like, dangerous or something. I just quit for a while and then try to ask a friend for help.

QP: ...some people sitting in my [mathematics] group and I can see their faces, the expression on their faces like they are tryin' [sic]...so I don't like budge in. I just wait until they ask for help.

JE: I made a goal to help our team...win just one game. Because all of our teammates like quitted [sic] in soccer. You could see that they just gave up and thought we'd never win. And I just wanted to at least like win one single game....

The students' answers in this area of affective self-regulation had not been anticipated. These results, along with all of the other data collected in this study, are summarized in the following section.

Summary of the Findings

This mixed-method study explored the effects of goal setting and self-monitoring on the puzzle performance, goal orientation, task interest, self-efficacy, and self-reactions of 70 sixth-grade students. It also examined the students' attributions when they struggled with the puzzle and looked for connections between those attributions and goal setting, puzzle performance, task interest, self-efficacy, and self-reactions. Finally, it looked at the students' experiences solving the puzzle in the goal-setting and self-monitoring conditions and explored commonalities in the students' experiences.

The first three research questions were answered by conducting a one-way analysis of variance between the students in the goal-setting and self-monitoring conditions and the variables of puzzle performance, goal orientation, task interest, self-efficacy, and self-reactions. The fourth question was analyzed by a point-biserial correlation between the students' attributions and their puzzle performance, task interest, self-efficacy, and self-reactions. The fifth and sixth questions were analyzed qualitatively using an issue-focused approach.

The first research question analyzed the effect of goal setting on puzzle performance, goal orientation, task interest, self-reactions, and self-efficacy. A significant main effect was found for goal setting with the variables of puzzle performance, self-reactions, and self-efficacy. The variable of task interest approached significance.

The second research question looked for a significant main effect for self-monitoring on puzzle performance, goal orientation, task interest, self-reactions, and self-efficacy. The only significant main effect for self-monitoring was found with the variable of task interest.

The third research question looked for significant interactions between the goal-setting and self-monitoring conditions. The variable of self-reactions was the only one of the dependent variables to show a significant interaction.

The fourth research question examined the role of students' attributions on their puzzle performance, task interest, self-reactions, and self-efficacy by looking at the categories of attributions and the relationship between the kinds of attributions made and the process and outcome of goal-setting conditions. It also looked correlations between

the types of attributions and the dependent variables mentioned above. There was a clear indication that students in the process-goal groups attributed their struggle with the puzzle to strategy deficiencies, while students in the outcome-goal groups cited lack of ability or “I don’t know” as their reason for not succeeding in the puzzle task. Significant positive correlations were also found between students’ citation of strategy use and puzzle performance, self-reactions, and self-efficacy. Significant negative correlations were found between students’ attributions to lack of ability and task interest, and also between students’ attribution of “I don’t know” and their self-efficacy.

The fifth research question looked at the students’ approach to the puzzle task and discovered some patterns in the students’ group placement and their descriptions of the puzzle experience, as well as the way they described what they did when they got stuck on the puzzle. Students in the process-goal groups tended to describe the puzzle task as challenging and could point to specific strategies they tried when they got stuck. Students in the outcome-goal groups most often said they did not know why they struggled when they encountered difficulty and more often referred to the puzzle as difficult; they were also the only students in the small number of interviewed students to describe the puzzle experience in negative terms.

The sixth research question looked at common characteristics of students who showed high levels of self-efficacy during the puzzle task. The commonalities found showed that students who were highly self-efficacious employed self-regulatory strategies in their approach to homework and managing their afterschool time. Families played a part in the students’ use of self-regulatory strategies some of the time, though no

cultural commonalities could be found in the short focus group interviews that were held. However, an interesting emerging theme concerning the students' use of self-regulatory strategies in emotional contexts was found.

The combined data collected during the process of answering each of the research questions provides some information worth considering about the development of self-regulation and its potential influences on sixth-grade students' motivation. These results, the limitations of the study, and the educational implications will be discussed in greater detail in the following chapter.

Chapter 5. Discussion

This study examined the effects of goal setting and self-monitoring on selected sixth-grade students' performance solving puzzles, more specifically their goal orientation, interest in the task, self-efficacy, and self-reactions. It also looked at the students' perceptions as they engaged in a puzzle task and examined similarities and differences among the students who reported high levels of self-efficacy. This chapter integrates the results of the study with the relevant literature of the field, looking at each research question in turn. Discussion of the implications for practice, limitations of the study, and recommendations for future research follow.

Discussion of the Results

Research Question 1: Is there a main effect for goal setting on the students' performance, goal orientation, interest in the task, self-efficacy, and self-reactions?

It was hypothesized that goal setting would have a positive effect on students' performance, goal orientation, interest, self-efficacy, and self-reactions. ANOVAs performed to examine differences between the groups in this study partially supported this hypothesis. The results showed a significant difference for goal setting in the areas of puzzle performance, self-efficacy, and self-reactions. An examination of the means for each group also showed that students in the process-goal groups had higher scores for the variables of puzzle performance, self-efficacy, and self-reaction.

Previous research has found that setting process goals while learning a task can make a difference for students' performance (Kitsantas et al., 2004; Kitsantas & Zimmerman, 1998; Zimmerman & Kitsantas, 1997), so the results of the first research question are aligned with what is already known about the potential influence of goal setting. The positive result for setting process goals stems from the fact that students in the process-goal condition were focused on learning the steps to solve the puzzle and students in the outcome-goal condition were focused only on getting the puzzle right. By focusing on the steps to solve the puzzle, it is likely that students in the process-goal condition were better prepared to perform the steps on the post-test puzzle, leading to higher scores for this group.

Conversely, students in the outcome-goal condition focused on getting the puzzle right and ended up giving up more often, suggesting that they were more likely to be discouraged by the difficulty of the puzzle. In that aspect, these results are consistent with the findings of several previous studies, which have shown that failure is most detrimental for individuals who are orientated toward outcome goals (Elliott & Dweck, 1988; Kitsantas & Zimmerman, 1998; Kitsantas et al., 2004; Pintrich & De Groot, 1990; Schunk, 1996; Zimmerman & Kitsantas, 1999).

It was hypothesized that students in all goal-setting groups would outperform the students in the control group. The results support this hypothesis partially; students in the outcome-goal group that did not self-monitor scored slightly lower than the control group. All other experimental groups scored higher than the control, with the self-monitoring process-goal group scoring the highest. The difference in focus of the

process- and outcome-goal conditions could explain why students in the outcome-goal group that did not self-monitor scored so low. The outcome-goal groups were focused only on getting the puzzle right, and during the practice session, those students were told to only pay attention to the number of cards they answered correctly. Due to the challenging nature of the task, many students completed only one practice card, with some completing none at all.

Observation notes from these groups showed that students in the outcome groups that did not self-monitor displayed more signs of the following behaviors during the post-test: fidgeting, sighing, tapping the table, or wringing their hands as they worked (field notes, 2010). This would suggest that the focus on being right could have induced a fear of failure that interfered with the students' ability to complete the post-task puzzle (Elliott & Dweck, 1988; Hole & Crozier, 2007).

Students in the outcome groups that did self-monitor perhaps avoided the behaviors observed during the outcome-goal groups because the self-monitoring helped them see progress in their work toward completing the puzzles. In Bandura's research about Social Cognitive Theory, self-monitoring is a vital strategy in the process of self-regulation; it is the way people pay attention to how they are doing, which influences self-efficacy and motivation (1991). This may help explain why students who self-monitored in the outcome-goal condition did better than those who did not; keeping track of their progress was an affirmation that they were working toward a goal and this feeling of achieving progress could have increased students' feelings of efficacy.

It was also hypothesized that students in the experimental groups would score higher than the control group in terms of task interest; this hypothesis was not supported because the difference in groups' scores did not reach significance. However, an examination of the means for the variable of task interest showed that students in the process-goal condition scored higher than students in the outcome-goal groups or the control group and the difference approached significance. The failure to reach significance may be due to the small sample size, and this variable is worth investigating in future studies because the literature on the effect of goal setting on task interest has shown that interest in a task can be related to a person's sense of mastery of that task and that setting goals can help achieve that sense of mastery and increase task interest (Bandura & Schunk, 1981).

In terms of self-efficacy scores, it was hypothesized that students in all goal setting groups would score higher than students in the control group and this hypothesis was partially substantiated. There was a significant main effect for goal setting on the variable of self-efficacy and students in the process-goal condition did report higher self-efficacy scores than students in the control group. Conversely, students in the outcome-goal group scored lower than students in the control group. The lower efficacy scores for the outcome goal group may be explained by the focus inherent in the outcome goal orientation: to solve the puzzle correctly. Students in that group who did not achieve the goal of success are likely to have a lower sense of self-efficacy and score lower on that measure (Kitsantas et al., 2004; Kitsantas & Zimmerman, 1998; Middleton & Midgley, 1997; Pajares et al., 1999, 2000; Wolters et al., 1996; Zimmerman & Kitsantas, 1997).

Another facet in that interpretation of the lower scores is a fear of failure. It is possible that the success-driven focus of the outcome goal induced a fear of failing that lowered the students' sense of self-efficacy (Elliott & Dweck, 1988; Hole & Crozier, 2007).

For the variable of self-reactions, it was hypothesized that students in all goal-setting groups would score significantly higher than students in the control group. This hypothesis was fully supported by the results of the study with students in both the outcome-goal and process-goal groups displaying higher self-reactions scores than students in the control group. These results could be explained in light of Bandura's assertion within the Social Cognitive Theory that once selected goals have been met, people feel more satisfied with the process (1997). Another explanation could be found in the significant positive correlations between self-reactions and task interest and between self-reactions and self-efficacy. These correlations show a relationship between the variables that may mean students who were interested in the puzzle or experienced higher levels of self-efficacy during the puzzle task felt more satisfied with their performance and therefore had a higher self-reaction score. This explanation can also be supported by previous research that shows self-reactions, along with self-efficacy, are an integral part of the self-regulatory process and that self-regulation can lead to greater interest in a task (Bandura, 1989, 1997; Zimmerman, 1989b, 1994, 2004).

Research Question 2: Is there a main effect for self-monitoring on the students' performance, goal orientation, interest in the task, self-efficacy and self-reactions?

The hypothesis that self-monitoring would have a significant main effect on students' performance, goal orientation, interest, self-efficacy, and self-reactions received only partial support from the data. The ANOVA tests that were performed showed a significant main effect for self-monitoring on the variable of task interest. None of the other variables proved to be significant.

Previous research has shown self-monitoring can have a positive influence on performance (Kitsantas et al., 2004; Kitsantas & Zimmerman, 1998; Wood et al., 2002; Zimmerman & Kitsantas, 1997). Therefore, it is somewhat perplexing that self-monitoring did not have a significant main effect for puzzle performance, goal orientation, self-efficacy, and self-reactions in this study. However, it is possible that what the students were choosing to monitor was different from what the researcher had hoped they would monitor. As Bandura explained, self-monitoring influences outcomes; the extent to which it makes a difference in performance, behaviors, or self-efficacy depends on what a person is choosing to monitor (1989).

Students in the outcome groups were recording the number of cards they completed because in this condition progress toward the goal of getting the puzzle right was made by completing as many of the puzzle cards as possible. The number of cards was either a representation of how well the students were doing or a confirmation of how poorly they were doing. These results seem to indicate that there is no way to know if the students were attuned to the positive or negative as they monitored. Students in the performance groups were monitoring the steps they completed in the puzzle solving process; they were keeping track of their progress toward a goal. Progress does not bring

to mind the negative connotations of failure, so perhaps those students focusing on the positive aspects of completing several cards or making progress toward completing the task may have been counterbalanced by those students focusing on the negative aspect of how few cards they completed when they self-monitored (Bandura, 1989; Benenson & Dweck, 1986; Elliot & Dweck, 2005). The age range of the students participating the study may also have been influential in this outcome as well. At the middle school level students' conceptions of themselves as learners are still forming. Their level of efficacy may be fragile, and worrying about peers' perceptions of them may have played a part in this result (Mueller & Dweck, 1998).

Another explanation for the lack of significance between self-monitoring and performance, goal orientation, self-efficacy, and self-reactions could be explained by the short practice session provided during this study. Perhaps the students did not have enough time during the 30-minute puzzle practice to fully understand the idea behind self-monitoring and did not fully benefit from that aspect of the experience. When looking at the observation notes taken during the puzzle experiment, it was noted on a few occasions that students who should have been self-monitoring were not very diligent about it and in fact only marked the number of cards or steps they completed at the end of the period when the time was up. The results of those few students could have influenced the overall findings, and further research with students in different contexts with more time to practice and implement the self-monitoring strategy could afford significant findings for the strategy of self-monitoring when completing puzzle tasks (Obach, 2003; Rock, 2005; Zimmerman & Kitsantas, 1997).

Research Question 3: Is there an interaction between goal setting and self-monitoring on the students' performance, goal orientation, interest in the task, self-efficacy, and self-reactions?

It was hypothesized that there would be a significant interaction between goal setting and self-monitoring on the students' performance, goal orientation, interest in the task, self-efficacy, and self-reactions. In one of the previous pilot studies conducted by the researcher (King, 2008), a significant interaction was found between goal setting and self-monitoring for the variables of self-efficacy and self-reactions. An examination of means in both this study and the pilot studies revealed the mean self-reaction scores for students in the self-monitoring and process-goal group were almost equal to the mean self-reaction score for students in the self-monitoring and outcome-goal group.

Looking at this interaction it would seem that for students in the outcome goal groups, keeping track of their progress helped them feel more satisfied with their performance, thus resulting in a higher self-reaction score than students in outcome-goal groups that did not self-monitor. This finding is consistent with previous research that has shown progress toward a complex task can yield more satisfaction and a positive motivational orientation (Bandura, 1997). Additionally, in light of the research showing positive results for shifting goal orientations when acquiring a new skill, the strategy of self-monitoring could be explored as a means to help students sustain higher levels of satisfaction with their performance during the goal-shifting process, potentially leading to a more successful implementation of the shifting goals approach (Kitsantas & Zimmerman, 1998; Zimmerman & Kitsantas, 1997).

Research Question 4: Do students' attributions regarding their failure to solve the puzzle differ across the goal setting and self-monitoring conditions?

It was hypothesized that there would be a difference in the types of attributions students' made about their failure to solve the puzzle based on experimental conditions. Students in the process-goal group attributed their struggle with the puzzle to more positive attributions, such as strategy use or lack of practice, than students in the outcome or control group conditions. It was also believed that students who self-monitored would attribute their failure to more positive attributions as well. This hypothesis was substantiated by the data for the goal-setting conditions.

An inspection of the frequencies of attributions revealed that students in the control and the outcome-goal groups attributed their performance deficiencies most frequently to insufficient ability or an unknown cause. In contrast, students in the groups that emphasized process goals attributed their performance deficiencies overwhelmingly to strategy choice. This result is consistent with previous studies investigating attributions. These studies found that students in process-goal situations attributed their errors most frequently to strategy deficiencies, and students in outcome-goal situations attributed their errors to a lack of effort or ability (Kitsantas et al, 2000; Zimmerman & Kitsantas, 1999). This is an important finding for teachers at the elementary and middle school level because students could be taught to reflect on their failures and learn to reframe their attributions in an environment where it is still okay to make mistakes.

Correlations run on the attribution data revealed that students' attributions of strategy use were positively associated with puzzle performance, self-efficacy, and self-

reactions. Students' attributions of ability were negatively correlated with task interest. These findings follow previous research conducted in the area of developing self-regulation. Zimmerman (2000) explained that making attributions of failure to strategy use is a part of the self-reflection phase of self-regulated learning. Strategy attributions help learners sustain motivation to persist in a task when things become difficult; conversely, students who make attributions of poor performance to low ability experience lowered expectations and show diminished efforts for future improvement (Kitsantas et al., 2004; Zimmerman, 2000).

There was also a negative correlation found between an attribution of "I don't know" and self-efficacy. One interpretation of this finding is that students who were unable to articulate where they went wrong experienced lower self-efficacy because their inability to identify their error detracted from their confidence. This interpretation fits with the existing literature that aligns students' self-reactions with their attributions of success and confirms that learners who are satisfied with their performance hold high self-efficacy beliefs (Kitsantas et al., 2004; Schunk, 1996). This interpretation of the data also makes sense when it is viewed in comparison with the focus group interview data. Students who answered that they did not know why they failed to solve the puzzle during the practice session almost always stated that they did not feel very sure about their ability to solve the puzzle if they were given another chance to do so.

Research Question 5: In what ways do students approach the puzzle task when given an outcome goal and does that differ from the ways students approach the task when given a process goal?

When the data for this question were coded, integrated, and analyzed by the students' puzzle group placement, two differences emerged: one of students' perceptions of the puzzle, and the other of students' strategy use. When these data were viewed from the lens of process goal placement or outcome goal placement, it was discovered that students in outcome-goal groups more often approached the task in a negative way, explaining that the puzzle was too hard. This perception may explain why students in the outcome-goal groups gave up on the puzzle task more often than students in the process-goal groups or students in the control group. Students in the process-goal groups approached the task from a more positive perspective, referring to the puzzle as if it were a challenge and something they were capable of overcoming. This idea of encountering challenge vs. encountering difficulty is one that is consistent with the literature about goal orientations and their affect on motivation and persistence (Elliot & Dweck, 1998; Mueller & Dweck, 1998; Obach, 2003; Pajares, 1996; Pajares & Miller, 1994). It also fits with the quantitative data collected from this study during the puzzle groups; process-goal students performed better on the puzzle and had higher levels of self-efficacy and self-reactions. Students in the outcome-goal group had lower puzzle performance scores and reported lower self-efficacy.

The existing body of research provides evidence that students who set outcome goals are more likely to sacrifice learning opportunities related to challenging tasks because there is a fear making a mistake and this fear can lead to maladaptive patterns of behavior when faced with achievement setbacks, such as negative attributions, self-reactions, and impaired performance (Elliot & Dweck, 1998; Mueller & Dweck, 1998;

Pajares, 1996). Students interviewed in the current study from outcome-goal groups did make more negative attributions than students in the process or control groups; four of the six students in outcome-goal groups felt like their struggle with the puzzle was related to their lack of ability, one student stated he did not know why they were unsuccessful with the puzzle, and one shared that she felt she did not try hard enough. This may have been because the focus in these groups was on getting the puzzle right, and not being successful was something that was seen as mistake (Mueller & Dweck, 1998). Another explanation for the difference could be that students' attributions to their lack of ability dampened their expectations and desire to improve (Zimmerman, 2000).

Students in the process-goal groups most often attributed their puzzle struggle to trying the wrong strategy. This difference in attributions may have been because students in the process-goal groups were focused on the strategies for solving the puzzle during their practice time. This focus may have enabled them to refer back to those strategies to find a reason for their struggle; in contrast, students in the outcome-goal groups simply focused on getting the puzzle answered correctly. Those students may not have retained the background knowledge necessary for relating their struggle to a specific strategy (Kitsantas, Reiser & Doster, 2004).

Research Question 6: What characterizes the experiences of students who show high levels of self-efficacy and is there any evidence of cultural influences in these factors?

When examining the student profiles, which were composed of student demographics, interview data, observation notes, and puzzle data, two specific foci were

explored: how the students spent their afterschool time, and how students regulated their homework habits. The choice to explore these two factors was made to gain a preliminary understanding of students' perceptions of their home experiences with self-regulation and to try and determine if there were any patterns of cultural influence evident in their responses.

While it was thought there may be some cultural influences at work in the choices families made about how students' spent their afterschool time or the types of homework routines the students established, the data analysis did not provide support for this idea. No patterns were found in the students' responses that pointed to differences in cultural background. In other words, the types of family support mentioned in the students' responses did not really differ in terms of students' ethnicity, gender, or socio-economic background. The lack of findings for this aspect of the question may be due to the small sample participating in the interview groups ($n = 15$) or by the limited amount of actual interview time. Due to the extreme weather the area experienced during data collection, it was only possible to conduct one focus group session with each of the student groups. To delve into a complicated construct such as culture, more time may have been needed to get a better picture of the students' home lives, and perhaps interviews with their families would have provided more evidence to support that line of thinking. Finally, it may be that the cultural influences at work in the students' home experiences were so deeply ingrained in their consciousness that they did not perceive the support they were receiving or the support they were aware of did not correspond with the way the questions were asked (Banks, 2008).

While the results of the study did not uncover any patterns of cultural influence, the analysis did reveal that students who rated themselves high on the self-efficacy measure during the puzzle task tended to structure their afterschool time, and they talked about using self-regulatory strategies when they managed their homework load. Students scoring lower on self-efficacy scale during the puzzle task more often mentioned a lack of structure in their afterschool time and did not articulate any strategies for managing their homework load.

When the students in the focus groups discussed what they did after school, they cited any number of things from washing clothes and soccer practice to hanging out and playing video games. Students rating high on the self-efficacy scale, however, were more apt to talk about ways they organized their time to ensure that everything got done. They frequently mentioned when they did their homework and how they prioritized all of the things they needed to do. Students scoring low on the self-efficacy scale more often described their afterschool time in vague terms, with no real mention of doing homework or organizing events. This difference in themes is supported by the literature about self-efficacy, which is often cited in research as being related to motivation, persistence, and effort (Bandura, 1977). In a study exploring the role of self-efficacy on homework practices (Zimmerman & Kitsantas, 2005), results confirmed that participants' homework practices were predictive of their self-efficacy beliefs about their learning abilities.

Homework practices also appeared in the second theme that emerged from the data when it was examined looking at characteristics of self-efficacious students. Students rating high in self-efficacy consistently mentioned the use of strategies, such as

breaking projects down into smaller parts, when managing their homework load. In contrast, students with low scores on the self-efficacy scale rarely mentioned any type of strategy use when asked about what they do when they are faced with a large amount of homework to do. They most often said they left it to the last minute or they just did it. This difference in strategy use between the two groups may be explained by existing research showing that self-efficacy can provide the impetus for students to use self-regulation strategies; this use of self-regulation strategies is in turn related to persistence and diligence in challenging situations (Bandura, 1977; Pajares, 1996; Schunk, 1996). Perhaps the students who were more self-efficacious when faced with the challenging puzzle task were more likely to be more self-efficacious in other academic areas of their lives. However, self-efficacy is considered a context specific trait, so it cannot be assumed that this is the case (Bandura, 1977, 1997; Pajares, 1996). Furthermore, given the small number of students interviewed in this study, any trends noted here cannot be considered conclusive.

Implications for Practice

This research studied a selected group of sixth graders as they attempted a challenging puzzle and examined the effect goal setting and self-monitoring had on their performance, goal orientation, interest in the task, self-efficacy, and self-reactions. The results, which showed that setting process goals helped increase the students puzzle performance, self-efficacy, and self-reactions, could be used as educators think about ways to help students engage and persevere when facing challenging tasks. Previous research, which also showed that goals enhance self-regulation through their effects on

motivation, learning, self-efficacy, and self-evaluations of progress (Bandura, 1997; Kitsantas et al., 2004; Kitsantas & Zimmerman, 1998; Middleton & Midgley, 1997; Pajares et al., 2000; Schunk, 1996; Wolters et al., 1996; Zimmerman & Kitsantas, 1997), provides support for the fact that including instruction on how to set process goals could be a powerful way to help students develop the strategies they need to tackle challenging academic tasks.

One example of how this could be incorporated in the classroom is to include goal setting as part of the pre-assessment process. As teachers begin a unit of study, they could ask students to set a goal for themselves that states what they would like to learn by the end of the unit. Then, as a means of determining what they already know about the topic, students would make a mind map of what they know, intentionally creating a space on the map for the things they have decided they would like to learn. This process would keep the students from setting more outcome oriented goals, such as “I want to get an A on the test,” because the focus of the activity would be on the learning process. As students progress through the unit, they would fill in their mind maps with the new things they are learning, charting their progress toward their goal.

Goal setting could also be incorporated in the classroom as teachers work with students on improving their reading and writing skills. While teachers meet with reading groups or conference with student writers, they could ask students to set goals for their learning. By doing this in a small group or one-on-one context, the teacher would be able to guide the students to craft process-oriented goals by helping them reframe their thinking if they are inclined to set outcome-oriented goals. For example, if a student

wanted to set an outcome-oriented goal of reading a certain number of books in a month, the teacher could acknowledge that goal and help them set a more process-oriented goal by saying, “That’s an admirable goal to set for yourself. What strategies might you want to work on so you can read that many books in a month?” By helping students set process goals for themselves throughout the year, teachers can provide the ongoing support needed to help them develop a more process-oriented way of thinking that can help increase their motivation to learn.

Other findings of this research may offer possibilities for improving students’ motivation in the classroom as well. For example, the self-monitoring condition, while not proving to be statistically significant for many of the variables examined in this study, did show a main effect for task interest. The lack of statistical main effects for the other variables may have been due to the limited time for implementation of this study. A number of other researchers have found that self-monitoring is a strategy that leads to increased motivation and persistence because it helps students evaluate their progress as they work toward a goal (Bandura, 1991; Kitsantas et al., 2004; Kitsantas & Zimmerman, 2009; Wood et al., 2002; Zimmerman & Kitsantas, 1997). Like goal setting, this strategy could be taught with the current curriculum to help students stay interested and motivated to keep trying when they are facing challenging tasks.

There are many possibilities for the integration of self-monitoring in the curriculum that would not require a great deal of additional effort on the part of classroom teachers. For example, reading logs are frequently used in classrooms as a way for teachers to ensure students are reading when they are supposed to; these could be

transformed from an accountability check to a progress check. Teachers would simply need to direct students to take note of the progress shown on their reading logs, either by keeping up with the number of pages they are reading over the course of a week or by counting how many different types of books they are choosing to read. This extra step would focus students on the idea that they are making progress and that keeping their reading logs is proof of that progress. If teachers were so inclined they could also have students graph the data from their reading logs to provide a clear visual representation of that progress, a self-monitoring technique shown to be particularly motivating in previous research (Kitsantas et al., 2004; Kitsantas & Zimmerman, 2009; Zimmerman & Kitsantas, 1997, 1999). Other ideas include having students use checklists to monitor their progress as they work on projects or during independent work time. This checklist would be a tool that could help students keep track of the activities they've completed; in addition to providing students with a reminder of their progress to help them stay on track, it also gives teachers away to build students' capacity for self-evaluating, a vital part of the self-regulatory cycle.

Other results from this study provide promising ideas for increasing students' ability to self-regulate in an academic setting. The data collected by analyzing students' attributions during this study seem particularly interesting in terms of academic implications. The results of this study showed that attributions played an important role in students' success and self-efficacy during the puzzle task. For sixth-grade students, learning to attribute failure to strategy instead of ability could mean higher self-efficacy

and increased motivation as they face increasingly difficult academic demands in high school.

Previous research shows that by the end of the middle school years, students' self-protecting attributional beliefs are firmly in place. Students attribute success outcomes to ability, and failure outcomes to effort (Obach, 2003). These changing roles of attributional beliefs are consistent with the existing research that shows students alter their beliefs about success and failure in order to maintain a positive self-image and project an outward appearance of being competent and capable, especially when there is risk of failure (Covington & Omelich, 1979; Elliot & Dweck, 2005; Pajares & Miller, 1994). If this is the case, teachers need to pay attention to students' attributions during the formative middle school years when the students' development of academic competence is so fragile.

During that period of early adolescence, when students are developing attributional patterns designed to preserve their sense of self, teachers can help students develop their self-awareness by finding out what attributions students are making when they succeed or fail at a task. For example, if a student fails a test, it would be worthwhile for the teacher to have the student reflect on what happened and explain their thinking about it. This could be done in a one-on-one student conference or in a whole class reflective writing activity. Through that process, the teacher would get clues about how the student is attributing the failure and could help redirect the students' thinking if it seems the student is inaccurately attributing the failure to ability. For example, if a student reports he /she failed the test because they were not smart enough, the teacher

could point to the student's past performances and times the student experienced success. By having the student compare a time he/she experienced success with the current failure, the teacher would be able to help the student to locate patterns of behavior that enabled success or engendered failure. Conversely, if a student attributes a test failure to effort, the teacher could help the student design a plan to help ensure they are properly prepared for the next test. Either way, the student is developing the ability to be a reflective, self-regulated learner.

The results of this study confirm previous findings about the positive influence of setting process-oriented goals (Benenson & Dweck, 1986; Dweck & Leggett, 1988; Elliot & Dweck, 2005; Moore et al., 2001; Zimmerman & Kitsantas, 1997, 1999), and provide support for the idea that process goals can increase self-efficacy, self-reactions, and performance on challenging tasks. The results also echo the existing research on attributions and the ways students' attributions affect their motivation and success in challenging tasks (Weiner, 1972; Wagner, Powers, & Irwin, 2001). In light of this data, it seems worthwhile for educators to consider implementing some ideas that support goal setting and increase students' awareness of their attributions in the classroom.

One idea that may be useful for educators to implement involves considering the types of goals that are set in the classroom and the influence of those goals on students' self-efficacy, self-reactions, performance, and interest. For example, if students are setting goals related to the outcome of getting good grades instead of goals related to the process of learning the content, students may be discouraged quickly and give up when the course work gets more demanding. Conversely, if the students have set goals with a

purpose of learning, they are more likely to stay engaged and persevere when things are challenging.

Educators might also consider encouraging students to set process goals in the classroom by helping them focus their efforts on how they learn the content instead of on how to pass the test. A teacher can accomplish this by providing explicit instruction in the strategies or steps of learning something new, and by asking students to pay attention to the steps in the process while they are learning a task. This can even be done with content that is typically delivered in a lecture; instead of saying, “This is what we are learning, take notes,” a teacher can rephrase it and say, “Today we are going to be studying this, and as we talk about it, I want you to think about how we might make sense of the information.” This type of introduction, accompanied with some focus questions during the lecture, may help teachers engage students in the process of learning. An example of a process oriented focus questions might be, “So we’ve learned this, and now we know this other thing. How do they relate?”

Educators might also consider increasing students’ awareness about how they are making attributions of success or failure. One method for accomplishing this is by providing a reflective writing prompt after every test that asks students to look at their answers and determine where they made mistakes: was it carelessness or was it a lack of understanding? By explicitly instructing students to reflect on how they are doing, and teaching them how to use the data from their work to inform those decisions, teachers can help students take note of how they are attributing their successes and failures, and guide them to take the steps necessary to make improvement. By helping students see where

their mistakes are the result of a lack of effort or carelessness, and where they are a lack of understanding about the subject, teachers can help increase the accuracy of students' attributions, and therefore increase their motivation to keep trying.

Finally, educators might consider implementing strategies to support self-regulated learning such as goal setting, self-monitoring and promoting students' development of those skills with a focus on teaching students how to transfer the use of strategies from one context to another. Teachers can help students increase their use of self-regulatory strategies by explicitly teaching the strategies as they relate to one subject, by providing time to practice, and by offering timely feedback as the students acquire them. Once the self-regulatory strategies are considered learned behaviors, teachers can then incorporate their use into other subjects or areas by directing students to their previous experience and by having students reflect on how the strategy might be different as they apply it in the new context.

Limitations and Bias

Limitations of the present study include a relatively small sample size ($N = 70$ for the statistical analyses) and the self-report nature of the scales, which brings in personal bias and the potential difference between participants' perceptions and actions. The amount of time for focus group sessions with the students is also a limitation because the qualitative data collected was not as rich as it might have been if there had been more time for the focus group sessions and follow up interviews, which were not possible due to the unusually high snowfall that disrupted the study timeline and the researcher's access to the students. These limitations were tempered somewhat by the triangulation of data

sources that allowed the researcher to go back and check interview transcripts with students' accounts of what was going on against the notes from their puzzle experience and their puzzle scores to confirm that the data made sense.

This study was also somewhat limited by its location. The public school forum presented myriad obstacles to data collection including fire drills and snow days, which sometimes disrupted the flow of the puzzle experiment and provided distractions for the participating students. These disruptions were noted in the puzzle session notes, and the data was checked for outliers that related to any threat posed by the location.

There were also several potential threats to validity: care was taken to identify and address any potential internal, external, and measurement threats. For example, in order to reduce issues related to internal validity, the researcher conducted two pilot studies over the course of two years in order to finetune the measurements used for this dissertation research and become aware of any potential confounding variables. According to Maxwell (2005), this extended research period ensures more thorough data. This issue was also addressed by using scales from previous studies that had proven to be reliable. The self-efficacy, self-reactions, attribution, and task interest scales were all validated and used in previous studies (Kitsantas & Zimmerman, 1998; Zimmerman & Kitsantas, 1997).

The quantitative results of this study are limited in their generalizability. The first external validity issue concerns the fact the research was conducted with a relatively small group of students in a single school in the mid-Atlantic region of the United States. The second issue relates to the fact that the findings in this study relate to sixth-grade

students and their unique developmental level. Dweck (2002) contended that students' beliefs about ability begin to crystallize between 10-12 years of age, and this belief about ability influences the students' attributions and fear of failing. If these factors indeed played a part in the students' answers to the various scales and surveys, trying to generalize the results of this study to younger students may not be successful. The final issue of external validity relates to context specific nature of self-efficacy and other factors influencing motivation. For that reason, the findings of this study about puzzles do not automatically generalize to other academic areas.

When working with qualitative data, transferability is also factor to address. Transferability became an issue because of the snow storms that occurred during the data collection period. The inclement weather closed schools for a record number of days and limited the time for focus group interviews. This limitation prevented the researcher from conveying a very clear picture of the participants in the focus group interviews, so readers may not be able to transfer the findings of this research to other contexts as easily as they might have if there were more specific data on the students who were interviewed.

Another factor to consider when reviewing qualitative data is researcher bias. The researcher's assumptions and biases were ever present during this project. For example, after two pilot studies and other informal investigations that led up to the current study, there was an assumption that the students would want to participate in the puzzle project. This assumption could have led to a misinterpretation of negative affective behaviors during the puzzle observations; the awareness of this possibility led to the creation of a

third column in the observation notes that was headed, “What else could be going on?” This served as a continual reminder to be mindful of other perspectives.

The connection to this research after two years of working with these research questions made analyzing the qualitative data one of the most excruciating parts of data analysis. The transcripts were read over and over again in search of the story behind the words; it was a struggle to get past the thought, “Ok, they’re doing what they’re supposed to be doing. What’s the story here?” It wasn’t until all of the data was uploaded into a computer spreadsheet that things started to connect in a meaningful way. The impersonal look of the Excel spreadsheets finally helped the researcher break through that “too-connectedness” barrier.

Efforts were made to help with the validity of the qualitative results and reduce researcher bias. Two colleagues independently coded the qualitative data that was collected, and the results were compared with the researcher’s initial codes to add inter-rater reliability. Reflective memos were kept during this research process. As multiple puzzle groups were seen on the same day, these memos were important to ensure the accuracy of recollections made by the researcher in the analysis process.

Recommendations for Future Research

This study was limited in scope to one grade level in one school. Because of the promising nature of the findings in this one small sample, future studies should try and replicate these findings with other students at other grade levels. It would be particularly interesting to see how younger students would do with goal setting and self-monitoring during a puzzle task. If these strategies can make a significant impact on students’ ability

to self-regulate during challenging tasks, it would be beneficial to teach them these skills as early as possible. Qualitative methods would be especially interesting to use in studies of these strategies with younger children. The rich data that could be gathered about the contexts that best promote the use of self-regulatory strategies for younger students could support teachers as they work to implement them in the classroom.

More studies done with 11 and 12 year olds would also help fill a gap in the literature. Future research could take the goal-setting and self-monitoring strategies studied here and try them with middle school students in academic areas, looking for ways to integrate the strategies with the academic content. Promising results in this area could help teachers more efficiently incorporate these strategies into their teaching, resulting in greater access to these strategies for students who need them, and more investigation about how teachers can support the development of self-regulation in students could also ease their transition from elementary school to middle school.

In addition to doing studies that look at these findings in different age groups, it would be interesting to incorporate gender into the conversation as well. While this study did not look for any differences in the data based on gender, more research with larger populations could lead to some interesting findings that help us understand how gender might influence the development of self-regulation. It may also help us determine if there are any tendencies toward self-regulatory strategy use that vary with a student's gender.

An interesting aspect to this research that could be explored further is the role of the IB program on students' development of self-regulatory strategies. The students involved in this study were all students in an IB MYP school, and there are aspects of the

IB curriculum that would lend itself to teaching the students self-regulation strategies (IBO, 2005). For example, one of the students mentioned that there were a lot of independent projects happening in his classes connected to his IB Learner Profile (IBO, 2005). Though the limited time for student interviews prevented this researcher from exploring that aspect fully, the IB philosophy and approach to curriculum may provide a foundation for self-regulation that could be an interesting aspect for future study.

Further, it would be interesting to see the goal orientation aspect of this study investigated more fully in a context that examines how students acquire certain goal orientations. The existing literature links a mastery goal orientation to increased self-regulation, self-efficacy, motivation, and persistence (Elliot & Dweck, 1998; Mueller & Dweck, 1998). If certain environments or conditions can lead students to adopt a certain goal orientation, then finding out how best to do that would be worthwhile for teacher preparation programs. Finding out how students' home environments influence their goal orientation would be helpful for teachers as well.

Finally, it would be most worthwhile to do a more in-depth study of the ways students' cultural influences shape their self-efficacy and tendency to self-regulate. While this researcher had hoped to begin to uncover some of those potential effects in this study, the results fell very short in that area. This was disappointing because an insight into the influence of culture could be very beneficial given the current diversity that exists in our schools. In order to reach all students in our schools, we must first understand them and the journeys they have travelled to get to our classrooms. It is the fondest hope of this researcher that all of the positive possibilities of self-regulation on

motivation, self-efficacy, and perseverance can be developed in all students and that the findings of this study and others like it will encourage teachers to begin doing just that.

Appendix A: Photo of the Puzzle Task



Figure A1. Photo of the Serpentes puzzle created by ThinkFun! Games.

Appendix B1: Goal Orientation Scale (pre)

Goal Orientation Scale (PALS)

Please read carefully and circle one of the numbers.

It's important to me that I learn a lot of new concepts this year.

1	2	3	4	5
Not at all true		Somewhat true		Very true

One of my goals is to show others that I'm good at my class work.

1	2	3	4	5
Not at all true		Somewhat true		Very true

One of my goals in class is to learn as much as I can.

1	2	3	4	5
Not at all true		Somewhat true		Very true

It's important to me that I look smart compared to others in my class.

1	2	3	4	5
Not at all true		Somewhat true		Very true

One of my goals is to master a lot of new skills this year.

1	2	3	4	5
Not at all true		Somewhat true		Very true

It's important to me that I thoroughly understand my class work.

1	2	3	4	5
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Appendix B2: Goal Orientation Scale (post)

Goal Orientation Scale (PALS)

Please read carefully and circle one of the numbers.

It's important to me that I thoroughly understand my class work.

1	2	3	4	5
Not at all true		Somewhat true		Very true

It's important to me that I learn a lot of new concepts this year.

1	2	3	4	5
Not at all true		Somewhat true		Very true

One of my goals in class is to learn as much as I can.

1	2	3	4	5
Not at all true		Somewhat true		Very true

It's important to me that I look smart compared to others in my class.

1	2	3	4	5
Not at all true		Somewhat true		Very true

One of my goals is to show others that I'm good at my class work.

1	2	3	4	5
Not at all true		Somewhat true		Very true

One of my goals is to master a lot of new skills this year.

1	2	3	4	5
Not at all true		Somewhat true		Very true

It's important to me that I improve my skills this year.

1 2 3 4 5

Not at all true Somewhat true Very true

It's important to me that other students in my class think I am good at my class work.

1 2 3 4 5

Not at all true Somewhat true Very true

One of my goals is to show others that class work is easy for me.

1 2 3 4 5

Not at all true Somewhat true Very true

One of my goals is to look smart in comparison to the other students in my class.

1 2 3 4 5

Not at all true Somewhat true Very true

*Scale adapted from the work of Zimmerman and Kitsantas (1997, 1999).

Appendix C1: Self-Efficacy Scale

Self-Efficacy Measure

Please read carefully and circle one of the numbers:

How sure are you that you can complete this puzzle?

1	4	7	10
Not	Somewhat	Pretty	Very
Sure	Sure	Sure	Sure

*Scale adapted from the work of Zimmerman and Kitsantas (1997, 1999).

Appendix C2: Self-Reactions Scale

Self-Reactions Measure

Please read carefully and circle one of the numbers:

How satisfied are you with your performance solving puzzles today?

1	2	3	4	5	6	7	8	9	10
Not			Somewhat			Pretty			Very
Satisfied			Satisfied			Satisfied			Satisfied
☹									☺

*Scale adapted from the work of Zimmerman and Kitsantas (1997, 1999).

Appendix C3: Task interest Scale

Task interest Scale

Rank Popular Strategy Games

Please read carefully.

Which of the following games do you like to play? Rank them from 1 to 5 in order of your preference, 1 being your MOST FAVORITE game and 5 being your LEAST FAVORITE game.

___ Brain Teasers

___ Checkers

___ Chess

___ Mancala

___ Scrabble

Task interest Scale, part 2

Please read carefully and circle one of the numbers:

How interested are you in solving the Serpentiles puzzle?

1	2	3	4	5	6	7	8	9	10
Not			Somewhat			Pretty			Very
Interested			Interested			Interested			Interested

*Scale adapted from the work of Zimmerman and Kitsantas (1997, 1999).

Appendix C4: Attributions Scale

Attributions Scale

Please read carefully and answer the following question:

Why do you think you couldn't complete the puzzle today?

*Scale adapted from the work of Zimmerman and Kitsantas (1997, 1999).

Appendix D: Note-Taking Protocol

Observation Notes Template

(Used while students are completing the puzzle and as a reflection tool after the observations)

What I See	My Reactions	What else is going on?

Appendix E: Interview Protocol

Sample Interview Questions

Tell me a little bit about yourself.

Do you enjoy school? What is your favorite subject?

What kinds of after school activities do you participate in?

What do you do when you have a lot of homework? How do you handle that?

Do you feel that you get a lot of help with your homework? If so, who helps you?

Can you describe a typical afternoon/evening for you?

Did you enjoy solving the puzzle in this project?

What did you enjoy about it? What did you not enjoy? Etc.

Describe a time when you felt really proud of an accomplishment.

Can you think of an example from school? from outside of school?

If applicable:

We monitored our progress as we solved the puzzle in this project. Can you think of a time when you did something like that before? Please describe that experience.

We set goals as a part of this process. Have you had any previous experience setting goals?

Have you set goals in school before?

Have you set goals at home before?

Appendix F1: Parent Consent Form



The Impact of Goal-Setting on Self-Efficacy and Motivation

For Parents: INFORMED CONSENT FORM

RESEARCH PROCEDURES

This research is being conducted to determine if setting goals will help students feel more confident about their ability to solve puzzles. It will also examine the impact of setting goals on students' motivation to solve the puzzle.

If you allow your child to participate, they will be asked to spend about 30 minutes attempting to solve a brain teaser puzzle (much like a Rubik's Cube or a Sudoku puzzle). They will also be asked to answer some questions about how confident they are that they can solve the puzzle, about the ways they are trying to solve the puzzle and about how interested they are in trying to solve that puzzle. In addition, your child may be asked to participate in follow up interviews at a later date that will last about 5-10 minutes. Three students from each group in the study will be randomly selected to participate in these interviews, and the students can refuse to be interviewed if they are chosen but do not wish to be interviewed.

This study will occur in brief, small group sessions that take place during the school day. *It will be done in collaboration with your child's teacher and will not interfere with your child's school work or classes.*

RISKS

There are no foreseeable risks for participating in this research.

BENEFITS

There are no benefits to you or your child as a participant other than to further research in self-efficacy, goal-setting and motivation. We hope the results of this research will give us insight into ways teachers can better motivate students and how we can help all children learn and achieve more success in school.

CONFIDENTIALITY

The data in this study will be confidential. Names and/or other identifiers will not be placed on surveys, interview notes or other research data.

PARTICIPATION

Your child's participation is totally voluntary, and you may choose to withdraw your child from the study at any time and for any reason. If you decide you do not want your child to participate or if you withdraw him/her from the study, there is no penalty or negative consequence for you or your child. There are no costs to you or any other party associated with this research.

CONTACT

This research is being conducted by Shannon King and Dr. Anastasia Kitsantas at George Mason University. Ms. King may be reached at (703) 538-2668 and Dr. Kitsantas may be reached at (703) 993-2688 for questions or to report a research-related problem. You may contact the George Mason University Office of Research Subject Protections at 703-993-4121 if you have questions or comments regarding your rights as a participant in the research.

Approval for the use
of this document
EXPIRES

MAY 23 2010

1 of 2

Protocol # 586
George Mason University

This research has been reviewed according to George Mason University procedures governing your participation in this research.

CONSENT

I have read this form and agree to participate in this study.

Name

Date of Signature

Version date: 09/09

Approval for the use
of this document
EXPIRES

MAY 23 2010

Protocol # 5806
George Mason University

Appendix F2: Student Assent Form

The Impact of Goal-Setting on Self-Efficacy and Motivation

INFORMED ASSENT FORM

RESEARCH PROCEDURES

This research is being conducted to see if setting goals will help you feel more confident about your ability to solve puzzles. It will also try to figure out if setting goals will increase your motivation to solve the puzzle.



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Protocol # 5826
George Mason University

If you agree to participate, you will be asked to try and solve a new puzzle. You will also be asked to answer some questions about how confident you are that you can solve the puzzle, about your thinking as you try to solve the puzzle and about how interested you are in trying to solve that puzzle. Also, some students will be randomly selected to participate in focus group interviews. (That means that I will be talking to small groups of students about how they solved the puzzle and how they approached the task of solving the puzzle.)

RISKS

There are no foreseeable risks for participating in this research. (That just means you won't get hurt or be asked to do anything that will be bad for you.)

BENEFITS

There are no benefits to you as a participant other than to further research in how kids learn. We hope this research will help us understand what motivates students and helps them learn better, and you can help us do that. 😊

CONFIDENTIALITY

The data in this study will be confidential. (That means that your names will not be placed on surveys, interview notes or other research data. The answers you give to the questions will stay private because we won't ask you to put your name on anything.)

PARTICIPATION

Your participation in this study is voluntary, and you may withdraw from the study at any time and for any reason. (That means that you get to choose whether or not you want to be in this study or if you want to do an interview.)

If you decide not to participate or if you change your mind about being in the study, it is perfectly OK! You will not be asked to do anything that you do not want to do. There are no costs to you or your parents to participate.

CONTACT

This research is being conducted by Shannon King and Dr. Anastasia Kitsantas at George Mason University. Ms. King may be reached at (703) 531-2668 for questions or to report a research-related problem. Dr. Kitsantas may be reached at (703) 993-2688. You may contact the George Mason University Office of Research Subject Protections at 703-993-4121 if you have questions or comments regarding your rights as a participant in the research.

This research has been reviewed according to George Mason University procedures governing your participation in this research.

CONSENT

I have read this form and agree to participate in this study.

Name

Date of Signature

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George Mason University

Version date: 09/09



Appendix G: Strategy Checklist

Steps to Solve *SERPENTILES*

GOAL: To form a continuous path using all of the pieces shown on the card.

Carefully match the pieces you are using to the pieces shown on the card.

- Identify the connector pieces.
- Attach the connector pieces to the blue-striped pieces.
- Identify the curved pieces.
- Start attaching the most curved pieces to the connector pieces, making sure the curved pieces go inward.
- Using trial & error, attach the remaining pieces until the path is complete.

Serpentiles Strategy Checklist

Steps to Solve *SERPENTILES*

Check off the steps as you complete them.

___ Carefully match the pieces you are using to the pieces shown on the card.

___ Identify the connector pieces.

___ Attach the connector pieces to the blue-striped pieces.

___ Identify the curved pieces.

___ Start attaching the most curved pieces to the connector pieces, making
sure the curved pieces go inward.

___ Using trial & error, attach the remaining pieces until the path is complete.

Appendix H: Schedule of Puzzle Groups

Puzzle Groups									
	Control		Process/No SM		Process/SM		Outcome/No SM		Outcome/SM
13-Jan	1333295 1432297 1332730	20-Jan	1514227 1510509 1491197	24-Feb	1323530 1324665 1324675	11-Mar	1333943 1303243 1366863	18-Mar	1326416 1325872 1332489
13-Jan	1328432 1326428 1436797	27-Jan	1429816 1324386 1323708	25-Feb	1333219 1326543 1287010	11-Mar	1331819 1327011 1327012	19-Mar	1333782 1406464 1312779
14-Jan	1257434 1333326 1330583	27-Jan	1366148 1359118 1345630	25-Feb	1407256 1309985 1324743	12-Mar	1324987 1326366 1325037	19-Mar	1380260 1467397 1305112
14-Jan	1326567 1312783 1308772	18-Feb	1343612 1515679 1325043	10-Mar	1309479 1315113 1406251	12-Mar	1423702 1505031 1323723	24-Mar	1303086 1331833 1262392
20-Jan	1458552 1421415 1343062	24-Feb	1409684 1302801 1309150	10-Mar	1506462 1475757 1381141	18-Mar	1406662 1446027 1519165	24-Mar	1349016 1282761 1266358

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Curriculum Vitae

Shannon R. King was born on January 30, 1972 in Charlotte, North Carolina. She earned her Bachelor's of Arts in Music from the University of North Carolina at Chapel Hill in 1996, and her Master of Education in Curriculum and Instruction from George Mason University in 2003. An elementary education teacher for general education and advanced academics center classes for 10 years, she earned her National Board for Professional Teaching Standards certification in 2005. In addition to teaching elementary education classes, she also served as a gifted and talented resource teacher for 5 years. In 2009 she became an instructional coach for Fairfax County Public Schools where she is currently employed.